Appendix A

Primacy Revision Crosswalk

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
SUBPART A–GENERAL			
§141.2 DEFINITIONS			
Bag filters	§141.2		
Bank filtration	§141.2		
Cartridge filters	§141.2		
Flowing stream	§141.2		
Lake/reservoir	§141.2		
Membrane filtration	§141.2		
Plant intake	§141.2		
Presedimentation	§141.2		
Two-stage lime softening	§141.2		
Uncovered finished water reservoir	§141.2		
SUBPART Q–PUBLIC NOTIFICATION OF DRINKING WATER VIOLATIONS			
§141.211 SPECIAL NOTICE FOR REPEATED FAILURE TO CONDUCT MONITORING OF THE SOURCE WATER FOR *CRYPTOSPORIDIUM* AND OR FAILURE TO DETERMINE BIN CLASSIFICATION OR MEAN *CRYPTOSPORIDIUM* LEVEL.			
The owner or operator of a community or non-community water system that is required to monitor source water under	§141.211(a)		

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§ 141.701 must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in § 141.701(c). The notice must be repeated as specified in § 141.203(b).			
Systems must give special notice for failure to determine bin classification or mean *Cryptosporidium* level	§141.211(b)		
The public notice must follow the requirements for a Tier 2 public notice prescribed in § 141.203(c). The public notice must be presented as required in § 141.205(c).	§141.211(c)		
Mandatory language must be included in the special notice. The special notice for repeated failure to conduct monitoring must contain the following language: We are required to monitor the source of your drinking water for *Cryptosporidium.* Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We ''did not monitor or test'' or ''did not complete all monitoring or testing'' on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate *Cryptosporidium* removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date). For more information,	§141.211(d)(1)-(3)		

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please call (name of water system contact) of (name of water system) at (phone number). The special notice for failure to determine bin classification or mean Cryptosporidium level must contain the following language: We are required to monitor the source of your drinking water for Cryptosporidium in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number). Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.			

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APPENDIX A TO SUBPART Q OF PART 141–NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE			
10. LT2EWTR violations MCL/MRDL/TT Violations Tier of Public Notice Required — Citation 2 — 141.710–141.720 Monitoring and Testing Procedure Violations Tier of Public Notice Required — Citation 2*, 3 — 141.701–141.705; 141.708–141.709 * Failure to collect at least 3 samples for *Cryptosporidium* analysis is a Tier 2 violation requiring special notice.	Appendix A I.A.10		
SUBPART W–ENHANCED FILTRATION AND DISINFECTION FOR *CRYPTOSPORIDIUM*			
§141.700 GENERAL REQUIREMENTS			
The requirements of this subpart W are NPDWR. The regulations in this subpart establish or extend TT requirements in lieu of MCLs for *Cryptosporidium*. These requirements are in addition to requirements for filtration and disinfection in subparts H, P, and T of this part.	§141.700(a)		
Applicability. The requirements of this subpart apply to all subpart H systems, which are PWSs supplied by a surface water source and PWSs supplied by a ground water source under the direct influence of surface water.	§141.700(b)		

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Wholesale systems, as defined in §141.2, must comply with the requirements of this subpart based on the population of the largest system in the combined distribution system.	§141.700(b)(1)		
The requirements of this subpart for filtered systems apply to systems required by NPDWR to provide filtration treatment, whether or not the system is currently operating a filtration system.	§141.700(b)(2)		
The requirements of this subpart for unfiltered systems apply only to unfiltered systems that timely met and continue to meet the filtration avoidance criteria in subparts H, P, and T of this part, as applicable.	§141.700(b)(3)		
Requirements. Systems subject to this subpart must comply with the following requirements:	§141.700(c)		
Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for *Cryptosporidium*, *E. coli*, and turbidity as described in §§141.701 through 141.706, to determine what level, if any, of additional *Cryptosporidium* treatment they must provide.	§141.700(c)(1)		
Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in §§141.708 through 141.709.	§141.700(c)(2)		

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Filtered systems must determine their *Cryptosporidium* treatment bin classification as described in §141.710 and provide additional treatment for *Cryptosporidium*, if required, as described in §141.711. All unfiltered systems must provide treatment for *Cryptosporidium* as described in §141.712. Filtered and unfiltered systems must implement *Cryptosporidium* treatment according to the schedule in §141.713.	§141.700(c)(3)		
Systems with uncovered finished water storage facilities must comply with the requirements to cover the facility or treat the discharge from the facility as described in §141.714.	§141.700(c)(4)		
Systems required to provide additional treatment for *Cryptosporidium* must implement microbial toolbox options that are designed and operated as described in §§141.715 through 141.720.	§141.700(c)(5)		
Systems must comply with the applicable recordkeeping and reporting requirements described in §§141.721 through 141.722.	§141.700(c)(6)		
Systems must address significant deficiencies identified in sanitary surveys performed by EPA as described in §141.723.	§141.700(c)(7)		

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§141.701 SOURCE WATER MONITORING			
Systems must conduct the following monitoring on the schedule in paragraph (c) of this section unless they meet the monitoring exemption criteria in paragraph (d) of this section.	§141.701(a)		
Filtered systems serving at least 10,000 people must sample their source water for *Cryptosporidium, E. coli,* and turbidity at least monthly for 24 months.	§141.701(a)(1)		
Unfiltered systems serving at least 10,000 people must sample their source water for *Cryptosporidium* at least monthly for 24 months.	§141.701(a)(2)		
Filtered systems serving fewer than 10,000 people must sample their source water for *E. coli* at least once every two weeks for 12 months.	§141.701(a)(3)(i)		
A filtered system serving fewer than 10,000 people may avoid *E. coli* monitoring if the system notifies the State that it will monitor for *Cryptosporidium* as described in paragraph (a)(4) of this section. The system must notify the State no later than 3 months prior to the date the system is otherwise required to start *E. coli* monitoring under § 141.701(c).	§141.701(a)(3)(ii)		
Filtered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months	§141.701(a)(4)		

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if they meet one of the following, based on monitoring conducted under paragraph (a)(3) of this section:			
For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/ 100 mL.	§141.701(a)(4)(i)		
For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/ 100 mL.	§141.701(a)(4)(ii)		
The system does not conduct *E. coli* monitoring as described in paragraph (a)(3) of this section.	§141.701(a)(4)(iii)		
Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of paragraph (a)(4) of this section based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.	§141.701(a)(4)(iv)		

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For filtered systems serving fewer than 10,000 people, the State may approve monitoring for an indicator other than *E. coli* under paragraph (a)(3) of this section. The State also may approve an alternative to the *E. coli* concentration in paragraph (a)(4)(i), (ii) or (iv) of this section to trigger *Cryptosporidium* monitoring. This approval by the State must be provided to the system in writing and must include the basis for the State's determination that the alternative indicator and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in § 141.710.	§141.701(a)(5)		
Unfiltered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.	§141.701(a)(6)		
Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.	§141.701(a)(7)		
. Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in paragraph (a) of this section, unless they meet the monitoring exemption criteria in paragraph (d) of this section. Systems must conduct this monitoring on the schedule in paragraph (c) of this section.	§141.701(b)		

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Systems must begin monitoring required in §141.701(a) and (b) no later than the month beginning with the date listed in this section.	§141.701(c)		
Monitoring Avoidance. Filtered systems are not required to conduct source water monitoring under this subpart if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in § 141.711.	§141.701(d)(1)		
Unfiltered systems are not required to conduct source water monitoring under this subpart if the system will provide a total of at least 3-log *Cryptosporidium* inactivation, equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in § 141.712.	§141.701(d)(2)		
If a system chooses to provide the level of treatment in paragraph (d)(1) or (2) of this section, as applicable, rather than start source water monitoring, the system must notify the State in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under § 141.702. Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the State in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the applicable treatment compliance date in § 141.713.	§141.701(d)(3)		

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Plants operating only part of the year. Systems with subpart H plants that operate for only part of the year must conduct source water monitoring in accordance with this subpart, but with the following modifications:	§141.701(e)		
Systems must sample their source water only during the months that the plant operates unless the State specifies another monitoring period based on plant operating practices.	§141.701(e)(1)		
Systems with plants that operate less than six months per year and that monitor for *Cryptosporidium* must collect at least six *Cryptosporidium* samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.	§141.701(e)(2)		
New sources. A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under paragraph (c) of this section must monitor the new source on a schedule the State approves. Source water monitoring must meet the requirements of this subpart. The system must also meet the bin classification and *Cryptosporidium* treatment requirements of §§ 141.710 and 141.711 or § 141.712, as applicable, for the new source on a schedule the State approves.	§141.701(f)(1)		

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The requirements of § 141.701(f) apply to subpart H systems that begin operation after the monitoring start date applicable to the system's size under paragraph (c) of this section.	§141.701(f)(2)		
The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under § 141.710 or determination of the mean *Cryptosporidium* level under § 141.712, as applicable.	§141.701(f)(3)		
Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of §§ 141.702 through 141.706 is a monitoring violation.	§141.701(g)		
Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in paragraph (c) of this section to meet the initial source water monitoring requirements in paragraph (a) of this section. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in § 141.707.	§141.701(h)		

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§141.702 SAMPLING SCHEDULES			
Systems required to conduct source water monitoring under § 141.701 must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.	§141.702(a)		
Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in § 141.701(c) for each round of required monitoring.	§141.702(a)(1)		
Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under § 141.701(a) to EPA electronically at *https://intranet.epa.gov/lt2/*.	§141.702(a)(2)(i)		
If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.	§141.702(a)(2)(ii)		
Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring § 141.701(a) to the State.	§141.702(a)(3)		
Systems must submit sampling schedules for the second round of source water monitoring § 141.701(b) to the State.	§141.702(a)(4)		
If EPA or the State does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.	§141.702(a)(5)		

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Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of paragraph (b)(1) or (2) of this section applies.	§141.702(b)		
If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the State approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.	§141.702(b)(1)		
If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in § 141.704, or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.	§141.702(b)(2)(i)		
The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the State approves	§141.702(b)(2)(ii)		

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an alternative resampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.			
Systems that fail to meet the criteria of paragraph (b) of this section for any source water sample required under § 141.701 must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the State for approval prior to when the system begins collecting the missed samples.	§141.702(c)		
§141.703 SAMPLING LOCATIONS			
Systems required to conduct source water monitoring under § 141.701 must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the State may approve one set of monitoring results to be used to satisfy the requirements of § 141.701 for all plants.	§141.703(a)		
Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of paragraph (b)(2) of this section.	§141.703(b)(1)		
The State may approve a system to collect a source water sample after chemical treatment. To grant this approval, the State must determine that collecting a sample prior to	§141.703(b)(2)		

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chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.			
Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.	§141.703(c)		
Bank filtration. Systems that receive *Cryptosporidium* treatment credit for bank filtration under § 141.173(b) or § 141.552(a), as applicable, must collect source water samples in the surface water prior to bank filtration.	§141.703(d)(1)		
Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under § 141.717(c).	§141.703(d)(2)		
Multiple sources. Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in paragraph (e)(1) or (2) of this section. The use of multiple sources during monitoring must be consistent with routine operational practice.	§141.703(e)		

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If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.	§141.703(e)(1)		
If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either paragraph (e)(2)(i) or (ii) of this section for sample analysis.	§141.703(e)(2)		
Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.	§141.703(e)(2)(i)		
Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.	§141.703(e)(2)(ii)		
Additional Requirements Systems must submit a description of their sampling location(s) to the State at the same time as the sampling schedule required under § 141.702. This description must address the position of the sampling location in relation to the system's water source(s) and	§141.703(f)		

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treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the State does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).			
§141.704 ANALYTICAL METHODS			
Cryptosporidium. Systems must analyze for *Cryptosporidium* using *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA* (EPA-815-R-05-002) or *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA* (EPA-815-R-05-001), which are incorporated by reference.	§141.704(a)		
Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in paragraph (a) of this section. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in paragraph (a) of this section, up to a packed pellet volume of at least 2 mL.	§141.704(a)(1)		
Matrix spike (MS) samples, as required by the methods in paragraph (a) of this section, must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under § 141.705.	§141.704(a)(2)(i)		
If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of	§141.704(a)(2)(ii)		

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source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.			
Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.	§141.704(a)(3)		
E. coli. Systems must use methods for enumeration of *E. Coli* in source water approved in § 136.3(a) of this title.	§141.704(b)		
The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of paragraph (b)(2) of this section.	§141.704(b)(1)		
The State may approve on a case- by-case basis the holding of an *E. Coli* sample for up to 48 hours between sample collection and initiation of analysis if the State determines that analyzing an *E. Coli* sample within 30 hours is not feasible. *E. Coli* samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in § 136.3(a) of this title.	§141.704(b)(2)		
Systems must maintain samples between 0EC and 10EC during storage and transit to the laboratory.	§141.704(b)(3)		
Turbidity. Systems must use methods for turbidity measurement approved in § 141.74(a)(1).	§141.704(c)		

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§141.705 REQUIREMENTS FOR USE OF AN APPROVED LABORATORY			
Cryptosporidium. Systems must have *Cryptosporidium* samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent State laboratory certification program.	§141.705(a)		
E. coli. Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the State for total coliform or fecal coliform analysis under § 141.74 is approved for *E. Coli* analysis under this subpart when the laboratory uses the same technique for *E. Coli* that the laboratory uses for § 141.74.	§141.705(b)		
Turbidity. Measurements of turbidity must be made by a party approved by the State.	§141.705(c)		
§141.706 REPORTING SOURCE WATER MONITORING RESULTS			
Systems must report results from the source water monitoring required under § 141.701 no later than 10 days after the end of the first month following the month when the sample is collected.	§141.706(a)		
All systems serving at least 10,000 people must report the results from the initial source water monitoring required under § 141.701(a) to EPA electronically at https://intranet.epa.gov/lt2/.	§141.706(b)(1)		

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If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.	§141.706(b)(2)		
Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under § 141.701(a) to the State.	§141.706(c)		
All systems must report results from the second round of source water monitoring required under § 141.701(b) to the State.	§141.706(d)		
Systems must report the applicable information in paragraphs (e)(1) and (2) of this section for the source water monitoring required under § 141.701.	§141.706(e)		
Systems must report the following data elements for each *Cryptosporidium* analysis: (1) PWS ID (2) Facility ID (3) Sample collection date (4) Sample type (field or matrix spike) (5) Sample volume filtered (L), to nearest 1/4 L (6) Was 100% of filtered volume examined (7) Number of oocysts counted	§141.706(e)(1)		
For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.	§141.706(e)(1)(i)		

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For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.	§141.706(e)(1)(ii)		
For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.	§141.706(e)(1)(iii)		
Systems must report the following data elements for each *E. coli* analysis: (1) PWS ID (2) Facility ID (3) Sample collection date (4) Analytical method number (5) Method type (6) Source type (flowing stream, lake/reservoir, GWUDI) (7) *E. coli*/100 mL (8) Turbidity (Systems serving fewer than 10,000 people that are not required to monitor for turbidity under §141.701(c) are not required to report turbidity with their *E. coli* results.)	§141.706(e)(2)		
§141.707 GRANDFATHERING PREVIOUSLY COLLECTED DATA			
Systems may comply with the initial source water monitoring requirements of § 141.701(a) by grandfathering sample results collected before the system is required to	§141.707(a)(1)		

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begin monitoring (i.e., previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this section and the State must approve.			
A filtered system may grandfather *Cryptosporidium* samples to meet the requirements of § 141.701(a) when the system does not have corresponding *E. Coli* and turbidity samples. A system that grandfathers *Cryptosporidium* samples without *E. Coli* and turbidity samples is not required to collect *E. Coli* and turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under § 141.701(a).	§141.707(a)(2)		
E. coli sample analysis. The analysis of *E. Coli* samples must meet the analytical method and approved laboratory requirements of §§ 141.704 through 141.705.	§141.707(b)		
Cryptosporidium sample analysis. The analysis of *Cryptosporidium* samples must meet the criteria in this paragraph.	§141.707(c)		
Laboratories analyzed *Cryptosporidium* samples using one of the analytical methods in paragraphs (c)(1)(i) through (vi) of this section, which are incorporated by reference.	§141.707(c)(1)		
Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002.	§141.707(c)(1)(i)		

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Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001.	§141.707(c)(1)(ii)		
Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821-R-01-025.	§141.707(c)(1)(iii)		
Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821-R-01-026.	§141.707(c)(1)(iv)		
Method 1623: *Cryptosporidium and Giardia in Water by Filtration/IMS/FA*, 1999, United States Environmental Protection Agency, EPA-821-R-99-006.	§141.707(c)(1)(v)		
Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-001.	§141.707(c)(1)(vi)		
For each *Cryptosporidium* sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in paragraph (c)(1) of this section.	§141.707(c)(2)		
Sampling location. The sampling location must meet the conditions in § 141.703.	§141.707(d)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Sampling frequency. Cryptosporidium samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in § 141.702(b)(1) and (2) if the system provides documentation of the condition when reporting monitoring results.	§141.707(e)		
The State may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the State specifies to ensure that the data used to comply with the initial source water monitoring requirements of § 141.701(a) are seasonally representative and unbiased.	§141.707(e)(1)		
Systems may grandfather previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, systems must follow the monthly averaging procedure in § 141.710(b)(5) or § 141.712(a)(3), as applicable, when calculating the bin classification for filtered systems or the mean *Cryptosporidium* concentration for unfiltered systems.	§141.707(e)(2)		
Reporting monitoring results for grandfathering. Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph. Systems serving at least 10,000 people must report this information to EPA unless the State approves reporting to the State rather than	§141.707(f)		

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EPA. Systems serving fewer than 10,000 people must report this information to the State.			
Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of § 141.701(a). Systems must report this information no later than the date the sampling schedule under § 141.702 is required.	§141.707(f)(1)		
Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in paragraphs (f)(2)(i) through (iv) of this section, no later than two months after the applicable date listed in § 141.701(c).	§141.707(f)(2)		
For each sample result, systems must report the applicable data elements in § 141.706.	§141.707(f)(2)(i)		
Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this subpart, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.	§141.707(f)(2)(ii)		

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Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.	§141.707(f)(2)(iii)		
For *Cryptosporidium* samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in paragraph (c)(1) of this section were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.	§141.707(f)(2)(iv)		
If the State determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the State may disapprove the data. Alternatively, the State may approve the previously collected data if the system reports additional source water monitoring data, as determined by the State, to ensure that the data set used under § 141.710 or § 141.712 represents average source water conditions for the system.	§141.707(g)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under § 141.701(a) and some of the data are rejected due to not meeting the requirements of this section, systems must conduct additional monitoring to replace rejected data on a schedule the State approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.	§141.707(h)		
§141.708 REQUIREMENTS WHEN MAKING A SIGNIFICANT CHANGE IN DISINFECTION PRACTICE			
Following the completion of initial source water monitoring under § 141.701(a), a system that plans to make a significant change to its disinfection practice, as defined in paragraph (b) of this section, must develop disinfection profiles and calculate disinfection benchmarks for *Giardia lamblia* and viruses as described in § 141.709. Prior to changing the disinfection practice, the system must notify the State and must include in this notice the information in paragraphs (a)(1) through (3) of this section	§141.708(a)		
A completed disinfection profile and disinfection benchmark for *Giardia lamblia* and viruses as described in § 141.709.	§141.708(a)(1)		
A description of the proposed change in disinfection practice.	§141.708(a)(2)		

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An analysis of how the proposed change will affect the current level of disinfection.	§141.708(a)(3)		
Significant changes to disinfection practice are defined as follows:	§141.708(b)		
Changes to the point of disinfection;	§141.708(b)(1)		
Changes to the disinfectant(s) used in the treatment plant;	§141.708(b)(2)		
Changes to the disinfection process; or	§141.708(b)(3)		
Any other modification identified by the state as a significant change to disinfection practice.	§141.708(b)(4)		
§141.709 DEVELOPING A PROFILE			

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems required to develop disinfection profiles under § 141.708 must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must monitor weekly during the period of operation. Systems must determine log inactivation for *Giardia lamblia* through the entire plant, based on CT99.9 values in Tables 1.1 through 1.6, 2.1 and 3.1 of § 141.74(b) as applicable. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the State.	§141.709(a)		
Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in paragraphs (b)(1) through (4) of this section. Systems with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(1) through (4) of this section for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in § 141.74(a).	§141.709(b)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.	§141.709(b)(1)		
For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.	§141.709(b)(2)		
The disinfectant contact time(s) (t) must be determined during peak hourly flow.	§141.709(b)(3)		
The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.	§141.709(b)(4)		
In lieu of conducting new monitoring under paragraph (b) of this section, systems may elect to meet the requirements of paragraphs (c)(1) or (2) of this section.	§141.709(c)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of paragraph (b) of this section may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.	§141.709(c)(1)		
Systems may use disinfection profile(s) developed under § 141.172 or §§ 141.530 through 141.536 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under § 141.172 or §§ 141.530 through 141.536 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.	§141.709(c)(2)		
Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in paragraphs (d)(1) through (3) of this section.	§141.709(d)		
Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (d)(1)(i) or (ii) of this section.	§141.709(d)(1)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.	§141.709(d)(1)(i)		
Determine successive $CTcalc/ CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/ CT_{99.9}$) values together to determine (Σ ($CTcalc/CT_{99.9}$)).	§141.709(d)(1)(ii)		
Systems using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CTcalc/ CT_{99.9}$) value of each segment and ($\Sigma(CTcalc/CT_{99.9})$) must be calculated using the method in paragraph (d)(1)(ii) of this section.	§141.709(d)(2)		
The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (d)(1) or (d)(2) of this section by 3.0.	§141.709(d)(3)		
Systems must calculate the log of inactivation for viruses using a protocol approved by the State.	§141.709(d)(4)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems must use the procedures specified in paragraphs (e)(1) and (2) of this section to calculate a disinfection benchmark.	§141.709(e)		
For each year of profiling data collected and calculated under paragraphs (a) through (d) of this section, systems must determine the lowest mean monthly level of both *Giardia lamblia* and virus inactivation. Systems must determine the mean *Giardia lamblia* and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly *Giardia lamblia* and virus log inactivation by the number of values calculated for that month.	§141.709(e)(1)		
The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of *Giardia lamblia* and virus log inactivation in each year of profiling data.	§141.709(e)(2)		
§141.710 BIN CLASSIFICATION FOR FILTERED SYSTEMS			
Following completion of the initial round of source water monitoring required under § 141.701(a), filtered systems must calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the *Cryptosporidium* results reported under § 141.701(a) and must follow the procedures in paragraphs (b)(1) through (5) of this section.	§141.710(a)		

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For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations	§141.710(b)(1)		
For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.	§141.710(b)(2)		
For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.	§141.710(b)(3)		
For systems with plants operating only part of the year that monitor fewer than 12 months per year under § 141.701(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.	§141.710(b)(4)		
If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs (b)(1) through (4) of this section.	§141.710(b)(5)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Filtered systems must determine their initial bin classification from the table in this section and using the *Cryptosporidium* bin concentration calculated under paragraphs (a)-(b) of this section.	§141.710(c)		
Following completion of the second round of source water monitoring required under § 141.701(b), filtered systems must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 141.701(b) and following the procedures in paragraphs (b)(1) through (4) of this section. Systems must then redetermine their bin classification using this bin concentration and the table in paragraph (c) of this section.	§141.710(d)		
Filtered systems must report their initial bin classification under paragraph (c) of this section to the State for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in § 141.701(c).	§141.710(e)(1)		
Systems must report their bin classification under paragraph (d) of this section to the State for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in § 141.701(c).	§141.710(e)(2)		
The bin classification report to the State must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.	§141.710(e)(3)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Failure to comply with the conditions of paragraph (e) of this section is a violation of the treatment technique requirement.	§141.710(f)		
§141.711 FILTERED SYSTEM ADDITIONAL *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS			
Filtered systems must provide the level of additional treatment for *Cryptosporidium* specified in this paragraph based on their bin classification as determined under § 141.710 and according to the schedule in § 141.713.	§141.711(a)		
Filtered systems must use one or more of the treatment and management options listed in § 141.715, termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in paragraph (a) of this section.	§141.711(b)(1)		
Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional *Cryptosporidium* treatment required under paragraph (a) of this section using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in §§ 141.716 through 141.720.	§141.711(b)(2)		
Failure by a system in any month to achieve treatment credit by meeting criteria in §§ 141.716 through 141.720 for microbial toolbox options that is at least equal to the level of treatment required in paragraph (a) of this section is a violation of the treatment technique requirement.	§141.711(c)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
If the State determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under § 141.701(a) or § 141.701(b), significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium*, the system must take actions specified by the State to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in § 141.715.	§141.711(d)		
§141.712 UNFILTERED SYSTEM *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS			
Determination of mean Cryptosporidium level.	§141.712(a)		
Following completion of the initial source water monitoring required under § 141.701(a), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.701(a). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete initial source water monitoring based on the schedule in § 141.701(c).	§141.712(a)(1)		
Following completion of the second round of source water monitoring required under § 141.701(b), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.701(b). Systems must report this value to the State for approval no	§141.712(a)(2)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
later than 6 months after the month the system is required to complete the second round of source water monitoring based on the schedule in § 141.701(c).			
If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the calculation of the mean *Cryptosporidium* level in paragraphs (a)(1) or (2) of this section.	§141.712(a)(3)		
The report to the State of the mean *Cryptosporidium* levels calculated under paragraphs (a)(1) and (2) of this section must include a summary of the source water monitoring data used for the calculation.	§141.712(a)(4)		
Failure to comply with the conditions of paragraph (a) of this section is a violation of the treatment technique requirement.	§141.712(a)(5)		
Cryptosporidium inactivation requirements. Unfiltered systems must provide the level of inactivation for *Cryptosporidium* specified in this paragraph, based on their mean *Cryptosporidium* levels as determined under paragraph (a) of this section and according to the schedule in § 141.713.	§141.712(b)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Unfiltered systems with a mean *Cryptosporidium* level of 0.01 oocysts/L or less must provide at least 2-log *Cryptosporidium* inactivation.	§141.712(b)(1)		
Unfiltered systems with a mean *Cryptosporidium* level of greater than 0.01 oocysts/L must provide at least 3- log *Cryptosporidium* inactivation.	§141.712(b)(2)		
Inactivation treatment technology requirements. Unfiltered systems must use chlorine dioxide, ozone, or UV as described in § 141.720 to meet the *Cryptosporidium* inactivation requirements of this section.	§141.712(c)		
Systems that use chlorine dioxide or ozone and fail to achieve the *Cryptosporidium* inactivation required in paragraph (b) of this section on more than one day in the calendar month are in violation of the treatment technique requirement.	§141.712(c)(1)		
Systems that use UV light and fail to achieve the *Cryptosporidium* inactivation required in paragraph (b) of this section by meeting the criteria in § 141.720(d)(3)(ii) are in violation of the treatment technique requirement.	§141.712(c)(2)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Use of two disinfectants. Unfiltered systems must meet the combined *Cryptosporidium* inactivation requirements of this section and *Giardia lamblia* and virus inactivation requirements of § 141.72(a) using a minimum of two disinfectants, and each of two disinfectants must separately achieve the total inactivation required for either *Cryptosporidium, Giardia lamblia*, or viruses.	§141.712(d)		
§141.713 SCHEDULE FOR COMPLIANCE WITH *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS			
Following initial bin classification under § 141.710(c), filtered systems must provide the level of treatment for *Cryptosporidium* required under § 141.711 according to the schedule in paragraph (c) of this section.	§141.713(a)		
Following initial determination of the mean *Cryptosporidium* level under § 141.712(a)(1), unfiltered systems must provide the level of treatment for *Cryptosporidium* required under § 141.712 according to the schedule in paragraph (c) of this section.	§141.713(b)		
Cryptosporidium treatment compliance dates. The table in this section presents treatment compliance dates for four system size categories.	§141.713(c)		

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If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under § 141.710(d), the system must provide the level of treatment for *Cryptosporidium* required under § 141.711 on a schedule the State approves.	§141.713(d)		
If the mean *Cryptosporidium* level for an unfiltered system changes following the second round of monitoring, as determined under § 141.712(a)(2), and if the system must provide a different level of *Cryptosporidium* treatment under § 141.712 due to this change, the system must meet this treatment requirement on a schedule the State approves.	§141.713(e)		
§141.714 REQUIREMENTS FOR UNCOVERED FINISHED WATER STORAGE FACILITIES			
Systems using uncovered finished water storage facilities must comply with the conditions of this section.	§141.714(a)		
Systems must notify the State of the use of each uncovered finished water storage facility no later than April 1, 2008.	§141.714(b)		
Systems must meet the conditions of paragraph (c)(1) or (2) of this section for each uncovered finished water storage facility or be in compliance with a State-approved schedule to meet these conditions no later than April 1, 2009.	§141.714(c)		
Systems must cover any uncovered finished water storage facility.	§141.714(c)(1)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve inactivation and/or removal of at least 4-log virus, 3-log *Giardia lamblia*, and 2-log *Cryptosporidium* using a protocol approved by the State.	§141.714(c)(2)		
Failure to comply with the requirements of this section is a violation of the treatment technique requirement.	§141.714(d)		
§141.715 MICROBIAL TOOLBOX OPTIONS FOR MEETING *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS			
Systems receive the treatment credits listed in the table in Systems receive the treatment credits listed in the table in paragraph (b) of this section by meeting the conditions for microbial toolbox options described in §§ 141.716 through 141.720. Systems apply these treatment credits to meet the treatment requirements in § 141.711 or § 141.712, as applicable.	§141.715(a)(1)		
Unfiltered systems are eligible for treatment credits for the microbial toolbox options described in § 141.720 only.	§141.715(a)(2)		
The table in this section presents microbial toolbox options, treatment credits, and criteria.	§141.715(b)		
§141.716 MICROBIAL TOOLBOX OPTIONS FOR MEETING *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS			

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Watershed control program. Systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this section.	§141.716(a)		
Systems that intend to apply for the watershed control program credit must notify the State of this intent no later than two years prior to the treatment compliance date applicable to the system in § 141.713.	§141.716(a)(1)		
Systems must submit to the State a proposed watershed control plan no later than one year before the applicable treatment compliance date in § 141.713. The State must approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in paragraphs (a)(2)(i) through (iv) of this section.	§141.716(a)(2)		
Identification of an "area of influence" outside of which the likelihood of *Cryptosporidium* or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under paragraph (a)(5)(ii) of this section.	§141.716(a)(2)(i)		
Identification of both potential and actual sources of *Cryptosporidium* contamination and an assessment of the relative impact of these sources on the system's source water quality.	§141.716(a)(2)(ii)		
An analysis of the effectiveness and feasibility of control	§141.716(a)(2)(iii)		

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measures that could reduce *Cryptosporidium* loading from sources of contamination to the system's source water.			
A statement of goals and specific actions the system will undertake to reduce source water *Cryptosporidium* levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.	§141.716(a)(2)(iv)		
Systems with existing watershed control programs (i.e., programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in paragraph (a)(2) of this section and must specify ongoing and future actions that will reduce source water *Cryptosporidium* levels.	§141.716(a)(3)		
If the State does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log *Cryptosporidium* treatment credit will be awarded unless and until the State subsequently withdraws such approval.	§141.716(a)(4)		
Systems must complete the actions in paragraphs (a)(5)(i) through (iii) of this section to maintain the 0.5-log credit.	§141.716(a)(5)		

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Submit an annual watershed control program status report to the State. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the State or as the result of the watershed survey conducted under paragraph (a)(5)(ii) of this section. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the State prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.	§141.716(a)(5)(i)		
Undergo a watershed sanitary survey every three years for community water systems and every five years for noncommunity water systems and submit the survey report to the State. The survey must be conducted according to State guidelines and by persons the State approves.	§141.716(a)(5)(ii)		

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The watershed sanitary survey must meet the following criteria: encompass the region identified in the State-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water *Cryptosporidium* levels; and identify any significant new sources of *Cryptosporidium.*	§141.716(a)(5)(ii)(A)		
If the State determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the State requires, which may be earlier than the regular date in paragraph (a)(5)(ii) of this section.	§141.716(a)(5)(ii)(B)		
The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The State may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.	§141.716(a)(5)(iii)		
If the State determines that a system is not carrying out the approved watershed control plan, the State may withdraw the watershed control program treatment credit.	§141.716(a)(6)		
Alternative source. A system may conduct source water monitoring that reflects a different intake location (either in	§141.716(b)(1)		

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the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the State approves, a system may determine its bin classification under § 141.710 based on the alternative source monitoring results.			
If systems conduct alternative source monitoring under paragraph (b)(1) of this section, systems must also monitor their current plant intake concurrently as described in § 141.701.	§141.716(b)(2)		
Alternative source monitoring under paragraph (b)(1) of this section must meet the requirements for source monitoring to determine bin classification, as described in §§ 141.701 through 141.706. Systems must report the alternative source monitoring results to the State, along with supporting information documenting the operating conditions under which the samples were collected.	§141.716(b)(3)		
If a system determines its bin classification under § 141.710 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in § 141.713. § 141.717 Pre-filtration treatment toolbox components.	§141.716(b)(4)		

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§141.717 PRE-FILTRATION TREATMENT TOOLBOX COMPONENTS			
Presedimentation. Systems receive 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.	§141.717(a)		
The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.	§141.717(a)(1)		
The system must continuously add a coagulant to the presedimentation basin.	§141.717(a)(2)		
The presedimentation basin must achieve the performance criteria in paragraph (3)(i) or (ii) of this section.	§141.717(a)(3)		
Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: $\log_{10}$(monthly mean of daily influent turbidity) - $\log_{10}$(monthly mean of daily effluent turbidity).	§141.717(a)(3)(i)		
Complies with State-approved performance criteria that demonstrate at least 0.5-log mean removal of micron- sized particulate material through the presedimentation process.	§141.717(a)(3)(ii)		

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Two-stage lime softening. Systems receive an additional 0.5-log *Cryptosporidium* treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.	§141.717(b)		
Bank filtration. Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this paragraph. Systems using bank filtration when they begin source water monitoring under § 141.701(a) must collect samples as described in § 141.703(d) and are not eligible for this credit.	§141.717(c)		
Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in paragraph (c)(4) of this section.	§141.717(c)(1)		
Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.	§141.717(c)(2)		

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Only horizontal and vertical wells are eligible for treatment credit.	§141.717(c)(3)		
For vertical wells, the ground water flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For horizontal wells, the ground water flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.	§141.717(c)(4)		
Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the State and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the State determines that microbial removal has been compromised, the State may revoke treatment credit until the system implements corrective actions approved by the State to remediate the problem.	§141.717(c)(5)		
Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under § 141.718(c).	§141.717(c)(6)		

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Bank filtration demonstration of performance. The State may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in paragraphs (c)(1)-(5) of this section.	§141.717(c)(7)		
The study must follow a State- approved protocol and must involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.	§141.717(c)(7)(i)		
The study must include sampling both from the production well(s) and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well(s).	§141.717(c)(7)(ii)		
§141.718 TREATMENT PERFORMANCE TOOLBOX COMPONENTS			
Combined filter performance. Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in § 141.74(a) and (c).	§141.718(a)		

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Individual filter performance. Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log *Cryptosporidium* treatment credit, which can be in addition to the 0.5-log credit under paragraph (a) of this section, during any month the system meets the criteria in this paragraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in § 141.174 or § 141.560, as applicable.	§141.718(b)		
The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.	§141.718(b)(1)		
No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.	§141.718(b)(2)		
Any system that has received treatment credit for individual filter performance and fails to meet the requirements of paragraph (b)(1) or (2) of this section during any month does not receive a treatment technique violation under § 141.711(c) if the State determines the following:	§141.718(b)(3)		
The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.	§141.718(b)(3)(i)		
The system has experienced no more than two such failures in any calendar year.	§141.718(b)(3)(ii)		

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Demonstration of performance. The State may approve *Cryptosporidium* treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than or less than the prescribed treatment credits in § 141.711 or §§ 141.717 through 141.720 and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.	§141.718(c)		
Systems cannot receive the prescribed treatment credit for any toolbox box option in §§ 141.717 through 141.720 if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.	§141.718(c)(1)		
The demonstration of performance study must follow a State-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the system.	§141.718(c)(2)		
Approval by the State must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The State may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.	§141.718(c)(3)		

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§141.719 ADDITIONAL FILTRATION TOOLBOX COMPONENTS			
Bag and cartridge filters. Systems receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in paragraphs (a)(1) through (10) of this section. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of paragraphs (a)(2) through (9) of this section to the State. The filters must treat the entire plant flow taken from a subpart H source.	§141.719(a)		
The *Cryptosporidium* treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in paragraphs (a)(2) through (a)(9) of this section. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in paragraphs (a)(2) through (9) of this section.	§141.719(a)(1)		
Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of *Cryptosporidium.* Bag or cartridge filters must be challenge	§141.719(a)(2)		

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tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.			
Challenge testing must be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium.* The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.	§141.719(a)(3)		
The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation: Maximum Feed Concentration = $1 \times 10^4 \times$ (Filtrate Detection Limit)	§141.719(a)(4)		
Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.	§141.719(a)(5)		
Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this subpart.	§141.719(a)(6)		

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Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation: $LRV = LOG_{10}(C_f) - LOG_{10}(C_p)$ where LRV = log removal value demonstrated during challenge testing; C_f = the feed concentration measured during the challenge test; and C_p = the filtrate concentration measured during the challenge test. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term C_p must be set equal to the detection limit.	§141.719(a)(7)		
Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up of a new filter; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter (LRV_{filter}) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.	§141.719(a)(8)		
If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRV_{filter} among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the	§141.719(a)(9)		

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set of LRV_{filter} values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.			
If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the State.	§141.719(a)(10)		
Membrane filtration.	§141.719(b)		
Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in § 141.2 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under paragraph (b)(1)(i) and (ii) of this section.	§141.719(b)(1)		
The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (b)(2) of this section.	§141.719(b)(1)(i)		
The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in paragraph (b)(3) of this section.	§141.719(b)(1)(ii)		

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Challenge Testing. The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the State. Challenge testing must be conducted according to the criteria in paragraphs (b)(2)(i) through (vii) of this section. Systems may use data from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria in paragraphs (b)(2)(i) through (vii) of this section.	§141.719(b)(2)		
Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.	§141.719(b)(2)(i)		
Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.	§141.719(b)(2)(ii)		

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The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation: Maximum Feed Concentration = $3.16 \times 10^{6} \times$ (Filtrate Detection Limit)	§141.719(b)(2)(iii)		
Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (i.e., backwashing).	§141.719(b)(2)(iv)		

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Removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation: $LRV = LOG_{10}(C_f) - LOG_{10}(C_p)$ Where: LRV = log removal value demonstrated during the challenge test; Cf = the feed concentration measured during the challenge test; and Cp = the filtrate concentration measured during the challenge test. Equivalent units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term Cp is set equal to the detection limit for the purpose of calculating the LRV. An LRV must be calculated for each membrane module evaluated during the challenge test.	§141.719(b)(2)(v)		
The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then LRVC-Test is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.	§141.719(b)(2)(vi)		
The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the	§141.719(b)(2)(vii)		

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membrane filtration module. This performance test must be applied to each production membrane module used by the system that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.			
If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the State.	§141.719(b)(2)(viii)		
Direct integrity testing. Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in paragraphs (b)(3)(i) through (vi) of this section. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., one or more leaks that could result in contamination of the filtrate).	§141.719(b)(3)		
The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of	§141.719(b)(3)(i)		

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the system for the purpose of integrity testing or other maintenance.			
The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.	§141.719(b)(3)(ii)		
The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the State, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either paragraph (b)(3)(iii)(A) or (B) of this section as applicable to the type of direct integrity test the system uses.	§141.719(b)(3)(iii)		
For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation: $LRV_{DIT} = LOG_{10}(Q_p / (VCF \times Q_{breach}))$ Where: LRVDIT = the sensitivity of the direct integrity test; Q_p = total design filtrate flow from the membrane unit; Q_{breach} = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.	§141.719(b)(3)(iii)(A)		

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For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation: $LRV_{DIT} = LOG_{10}(C_f) - LOG_{10}(C_p)$ Where: LRV_{DIT} = the sensitivity of the direct integrity test; C_f = the typical feed concentration of the marker used in the test; and C_p = the filtrate concentration of the marker from an integral membrane unit.	§141.719(b)(3)(iii)(B)		
Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the State.	§141.719(b)(3)(iv)		
If the result of a direct integrity test exceeds the control limit established under paragraph (b)(3)(iv) of this section, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.	§141.719(b)(3)(v)		
Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The State may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.	§141.719(b)(3)(vi)		

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Indirect integrity monitoring. Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in paragraphs (b)(4)(i) through (v) of this section. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in paragraphs (b)(3)(i) through (v) of this section is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the State summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.	§141.719(b)(4)		
Unless the State approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.	§141.719(b)(4)(i)		
Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.	§141.719(b)(4)(ii)		
Continuous monitoring must be separately conducted on each membrane unit.	§141.719(b)(4)(iii)		
If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit	§141.719(b)(4)(iv)		

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as specified in paragraphs (b)(3)(i) through (v) of this section.			
If indirect integrity monitoring includes a State-approved alternative parameter and if the alternative parameter exceeds a State-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (v) of this section.	§141.719(b)(4)(v)		
Second stage filtration. Systems receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the State approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process.	§141.719(c)		
Slow sand filtration (as secondary filter). Systems are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The State must approve the	§141.719(d)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
treatment credit based on an assessment of the design characteristics of the filtration process. This paragraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.			
§141.720 INACTIVATION TOOLBOX COMPONENTS			
Calculation of CT values. CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under paragraph (b) or (c) of this section must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in §§ 141.74(a) through (b).	§141.720(a)(1)		
Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.	§141.720(a)(2)		
CT values for chlorine dioxide and ozone.	§141.720(b)		
CT values for chlorine dioxide and ozone. (1) Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in paragraph (a) of this section.	§141.720(b)(1)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems receive the *Cryptosporidium* treatment credit listed in the table presented in this section by meeting the corresponding ozone CT values for the applicable water temperature, as described in paragraph (a) of this section.	§141.720(b)(2)		
Site-specific study. The State may approve alternative chlorine dioxide or ozone CT values to those listed in paragraph (b) of this section on a site- specific basis. The State must base this approval on a site-specific study a system conducts that follows a State- approved protocol.	§141.720(c)		
UV. Systems receive *Cryptosporidium*, *Giardia lamblia*, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in paragraph (d)(1) of this section. Systems must validate and monitor UV reactors as described in paragraphs (d)(2) and (3) of this section to demonstrate that they are achieving a particular UV dose value for treatment credit.	§141.720(d)		
UV dose table. The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in paragraph (d)(2) of this section. The UV dose values in this table are applicable only to post-filter applications of UV in filtered systems and to unfiltered systems.	§141.720(d)(1)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Reactor validation testing. Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in paragraph (d)(1) of this section (i.e., validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.	§141.720(d)(2)		
When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.	§141.720(d)(2)(i)		
Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.	§141.720(d)(2)(ii)		
The State may approve an alternative approach to validation testing.	§141.720(d)(2)(iii)		
Reactor monitoring. Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under paragraph (d)(2) of this section. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and	§141.720(d)(3)(i)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
other parameters the State designates based on UV reactor operation. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the State approves.			
To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in paragraphs (d)(1) and (2) of this section. Systems must demonstrate compliance with this condition by the monitoring required under paragraph (d)(3)(i) of this section.	§141.720(d)(3)(ii)		
§141.721 REPORTING REQUIREMENTS			
Systems must report sampling schedules under § 141.702 and source water monitoring results under § 141.706 unless they notify the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(d).	§141.721(a)		
Systems must report the use of uncovered finished water storage facilities to the State as described in § 141.714.	§141.721(b)		
Filtered systems must report their *Cryptosporidium* bin classification as described in § 141.710.	§141.721(c)		
Unfiltered systems must report their mean source water *Cryptosporidium* level as described in § 141.712.	§141.721(d)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems must report disinfection profiles and benchmarks to the State as described in §§ 141.708 through 141.709 prior to making a significant change in disinfection practice.	§141.721(e)		
Systems must report to the State in accordance with the following table for any microbial toolbox options used to comply with treatment requirements under § 141.711 or § 141.712. Alternatively, the State may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.	§141.721(f)		
§141.722 RECORDKEEPING REQUIREMENTS			
Systems must keep results from the initial round of source water monitoring under § 141.701(a) and the second round of source water monitoring under § 141.701(b) until 3 years after bin classification under § 141.710 for filtered systems or determination of the mean *Cryptosporidium* level under § 141.710 for unfiltered systems for the particular round of monitoring.	§141.722(a)		
Systems must keep any notification to the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(d) for 3 years.	§141.722(b)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems must keep the results of treatment monitoring associated with microbial toolbox options under §§ 141.716 through 141.720 and with uncovered finished water reservoirs under § 141.714, as applicable, for 3 years.	§141.722(c)		
§141.723 REQUIREMENTS TO RESPOND TO SIGNIFICANT DEFICIENCIES IDENTIFIED IN SANITARY SURVEYS PERFORMED BY EPA			
A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.	§141.723(a)		
For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.	§141.723(b)		
For sanitary surveys performed by EPA, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.	§141.723(c)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by EPA, or if there is no approved schedule, according to the schedule reported under paragraph (c) of this section if such deficiencies are within the control of the system.	§141.723(d)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	EXPLANATION OF STATE POLICIES AND PROCEDURES
PART 142–NPDWR IMPLEMENTATION		
§142.14 RECORDS KEPT BY STATES		
Any decisions made pursuant to the provisions of part 141, subpart W of this chapter.	§142.14(a)(9)	
Results of source water *E. coli* and *Cryptosporidium* monitoring.	§142.14(a)(9)(i)	
The bin classification after the initial and after the second round of source water monitoring for each filtered system, as described in §141.710 of this chapter.	§142.14(a)(9)(ii)	
Any change in treatment requirements for filtered systems due to watershed assessment during sanitary surveys, as described in §141.711(d) of this chapter.	§142.14(a)(9)(iii)	
The determination of whether the mean *Cryptosporidium* level is greater than 0.01 oocysts/L after the initial and after the second round of source water monitoring for each unfiltered system, as described in §141.712(a) of this chapter.	§142.14(a)(9)(iv)	
The treatment processes or control measures that systems use to meet their *Cryptosporidium* treatment requirements under §141.711 or §141.712 of this chapter.	§142.14(a)(9)(v)	
A list of systems required to cover or treat the effluent of an uncovered finished water storage facility, as specified in §141.714 of this chapter.	§142.14(a)(9)(vi)	

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	EXPLANATION OF STATE POLICIES AND PROCEDURES
§142.15 REPORTS BY STATES		
Subpart W. The bin classification after the initial and after the second round of source water monitoring for each filtered system, as described in §141.710 of this chapter.	§142.15(c)(6)(i)	
Any change in treatment requirements for these systems due to watershed assessment during sanitary surveys, as described in §141.711(d) of this chapter.	§142.15(c)(6)(ii)	
The determination of whether the mean *Cryptosporidium* level is greater than 0.01 oocysts/L both after the initial and after the second round of source water monitoring for each unfiltered system, as described in §141.712(a) of this chapter.	§142.15(c)(6)(iii)	
§142.16 SPECIAL PRIMACY CONDITIONS		
Requirements for states to adopt 40 CFR part 141, subpart W. In addition to the general primacy requirements elsewhere in this part, including the requirements that State regulations be at least as stringent as Federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, subpart W, must contain a description of how the State will accomplish the following program requirements where allowed in State programs.	§142.16(n)	
Approve an alternative to the *E. Coli* levels that trigger *Cryptosporidium* monitoring by filtered systems serving fewer than 10,000 people, as described in § 141.701(a)(5).	§142.16(n)(1)	

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	EXPLANATION OF STATE POLICIES AND PROCEDURES
Assess significant changes in the watershed and source water as part of the sanitary survey process and determine appropriate follow-up action for systems, as described in § 141.711(d) of this chapter.	§142.16(n)(2)	
Approve watershed control programs for the 0.5-log treatment credit in the microbial toolbox, as described in § 141.716(a) of this chapter.	§142.16(n)(3)	
Approve protocols for demonstration of performance treatment credits in the microbial toolbox, as allowed under § 141.718(c) of this chapter.	§142.16(n)(4)	
Approve protocols for alternative ozone and chlorine dioxide CT values in the microbial toolbox, as allowed under § 141.720(c) of this chapter.	§142.16(n)(5)	
Approve an alternative approach to UV reactor validation testing in the microbial toolbox, as allowed under § 141.720(d)(2)(iii) of this chapter.	§142.16(n)(6)	

Appendix B
Rule Requirements

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Enhanced Surface Water Treatment Rule; Final Rule. Federal Register. January 14, 2002. 67 FR 1812. EPA 815–Z–02–001.
USEPA. 2002b. Process for Designing a Watershed Initiative. 67 FR 36172, May 23, 2002.
USEPA. 2002c. Method 1103.1: Escherichia coli (E. coli) In Water By Membrane Filtration Using membrane-Thermotolerant Escherichia coli Agar (mTEC). U.S. Environmental Protection Agency, Office of Water, Washington, DC. EPA–821–R–02–020.
USEPA. 2002d. Laboratory Quality Assurance Evaluation Program for Analysis of Cryptosporidium Under the Safe Drinking Water Act; Agency Information Collection: Proposed Collection; Comment Request. Federal Register: March 4, 2002. 67 FR 9731.
USEPA. 2003a. National Primary Drinking Water Regulations: Long Term 2 Enhanced Surface Water Treatment Rule; Proposed Rule. 68 FR 47640, August 11, 2003.
USEPA. 2003b. Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Ambient Water. 68 FR 43272, July 21, 2003.
USEPA. 2005a. Economic Analysis for the Long Term 2 Enhanced Surface Water Treatment Rule. U.S. Environmental Protection Agency, Office of Water, Washington, DC. EPA–821–R–06–001.
USEPA. 2005b. Occurrence and Exposure Assessment for the Long Term 2 Enhanced Surface Water Treatment Rule. U.S. Environmental Protection Agency, Office of Water, Washington, DC. EPA–821–R–06–002.
USEPA. 2005c. Method 1622: Cryptosporidium in Water by Filtration/IMS/FA. EPA 815–R–05–001.
USEPA. 2005d. Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA. EPA 815–R–05–002.
USEPA. 2005e. Valuing Time Losses Due to Illness under the 1996 Amendments to the Safe Drinking Water Act. EPA Office of Water. Prepared by IEC Consultants.
Wang, J., R. Song, and S. Hubbs. 2001. Particle removal through riverbank filtration process, in W. Julich and J. Schubert, eds., Proceedings of the Internation Riverbank Filtration Conference, November 2–4, 2000, Dusseldorf, Germany, Internationale Arbeitsgemeinschaft der Wasserwork im Rheineinzugsgebiet.
Ware and Schaefer. 2005. The effects of time and temperature on flow cytometry enumerated live Cryptosporidium parvum oocysts. Letters in Applied Microbiology 41:385–389.
Yang, S., S.K. Benson, C. Du, and M.C. Healey. 2000. Infection of immunosuppressed C57BL/6N adult mice with a single oocyst of Cryptosporidium parvum. J Parasitol. 86(4):884–7.
Yates, R., K. Scott, J. Green, J. Bruno, and R. De Leon. 1998. Using Aerobic Spores to Evaluate Treatment Plant Performance. Proceedings, Annual Conference of the American Water Works Association, Denver, CO.

List of Subjects

40 CFR Part 9

Reporting and recordkeeping.

40 CFR Part 141

Environmental protection, Chemicals, Indians-lands, Incorporation by reference, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142

Environmental protection, Administrative practice and procedure, Chemicals, Indians-lands, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated: December 15, 2005.

Stephen L. Johnson,

Administrator.

■ For the reasons set forth in the preamble, title 40 chapter I of the Code of Federal Regulations is amended as follows:

PART 9—[AMENDED]

■ 1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 *et seq.*, 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345 (d) and (e), 1361; Executive Order 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 *et seq.*, 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

■ 2. In § 9.1 the table is amended as follows:

■ a. Under the heading ''National Primary Drinking Water Regulations Implementation'' by adding entries in numerical order for ''§ 141.706–141.710, 141.713–141.714, 141.716–141.723''.

■ b. Under the heading ''National Primary Drinking Water Regulations Implementation'' by removing entries § 142.15(c), 142.15(c)(6)–(7) and adding entries in numerical order for ''142.14(a)(9), 142.15(c)(6), and 142.16(n)'' as follows:

§ 9.1 OMB approvals under the Paperwork Reduction Act.

* * * * *

40 CFR citation	OMB control No.
* * * * * * *	
National Primary Drinking Water Regulations	
* * * * * * *	
141.706–141.710	2040–0266
141.713–141.714	2040–0266
141.716–141.723	2040–0266
National Primary Drinking Water Regulations Implementation	
* * * * * * *	
142.14(a)(9)	2040–0266
* * * * * * *	
142.15(c)(6)	2040–0266
* * * * * * *	
142.16(n)	2040–0266
* * * * * * *	

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

■ 3. The authority citation for Part 141 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

■ 4. Section 141.2 is amended by adding, in alphabetical order, definitions for ''Bag filters'', ''Bank filtration'', ''Cartridge filters'', ''Flowing stream'', ''Lake/reservoir'', ''Membrane filtration'', ''Plant intake'', ''Presedimentation'', and ''Two-stage lime softening'', and revising the definition for ''Uncovered finished water storage facility'' to read as follows:

§ 141.2 Definitions.

* * * * *

Bag filters are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to outside.

Bank filtration is a water treatment process that uses a well to recover surface water that has naturally infiltrated into ground water through a river bed or bank(s). Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other well(s).

* * * * *

Cartridge filters are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

* * * * *

Flowing stream is a course of running water flowing in a definite channel.

* * * * *

Lake/reservoir refers to a natural or man made basin or hollow on the Earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.

* * * * *

Membrane filtration is a pressure or vacuum driven separation process in which particulate matter larger than 1 micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

* * * * *

Plant intake refers to the works or structures at the head of a conduit through which water is diverted from a source (e.g., river or lake) into the treatment plant.

* * * * *

Presedimentation is a preliminary treatment process used to remove gravel, sand and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.

* * * * *

Two-stage lime softening is a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

Uncovered finished water storage facility is a tank, reservoir, or other facility used to store water that will undergo no further treatment to reduce microbial pathogens except residual disinfection and is directly open to the atmosphere.

* * * * *

■ 5. Subpart Q of part 141 is amended by adding § 141.211 to read as follows:

§ 141.211 Special notice for repeated failure to conduct monitoring of the source water for *Cryptosporidium* and for failure to determine bin classification or mean *Cryptosporidium* level.

(a) *When is the special notice for repeated failure to monitor to be given?* The owner or operator of a community or non-community water system that is required to monitor source water under § 141.701 must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in § 141.701(c). The notice must be repeated as specified in § 141.203(b).

(b) *When is the special notice for failure to determine bin classification or mean* Cryptosporidium *level to be given?* The owner or operator of a community or non-community water system that is required to determine a bin classification under § 141.710, or to determine mean *Cryptosporidium* level under § 141.712, must notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed report the determination as specified in § 141.710(e) or § 141.712(a), respectively. The notice must be repeated as specified in § 141.203(b). The notice is not required if the system is complying with a State-approved schedule to address the violation.

(c) *What is the form and manner of the special notice?* The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in § 141.203(c). The public notice must be presented as required in § 141.205(c).

(d) *What mandatory language must be contained in the special notice?* The notice must contain the following language, including the language necessary to fill in the blanks.

(1) The special notice for repeated failure to conduct monitoring must contain the following language:

> We are required to monitor the source of your drinking water for *Cryptosporidium*. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We ''did not monitor or test'' or ''did not complete all monitoring or testing'' on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate *Cryptosporidium* removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date).
>
> For more information, please call (name of water system contact) of (name of water system) at (phone number).

(2) The special notice for failure to determine bin classification or mean Cryptosporidium level must contain the following language:

> We are required to monitor the source of your drinking water for Cryptosporidium in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).

(3) Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.

■ 6. Appendix A to Subpart Q of part 141 is amended by adding entry number 10 under I.A. to read as follows:

Subpart Q—Public Notification of Drinking Water Violations

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]

Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of National Primary Drinking Water Regulations (NPDWR): [3]				
A. Microbiological Contaminants				
* * *	*	*	*	* *
10. LT2ESWTR violations	2	141.710–141.720	[22] 2, 3	141.701–141.705 and 141.708–141.709.
* * *	*	*	*	* *

[1] Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports) do not require notice, unless otherwise determined by the primary agency. Primacy agencies may, at their option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under § 141.202(a) and § 141.203(a).

[2] MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique.

[3] The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing procedure requirements.

* * * * * * *

[22] Failure to collect three or more samples for Cryptosporidium analysis is a Tier 2 violation requiring special notice as specified in § 141.211. All other monitoring and testing procedure violations are Tier 3.

■ 7. Part 141 is amended by adding a new subpart W to read as follows:

Subpart W—Enhanced Treatment for *Cryptosporidium*

General Requirements

Sec.
141.700 General requirements.

Source Water Monitoring Requirements

141.701 Source water monitoring.
141.702 Sampling schedules.
141.703 Sampling locations.
141.704 Analytical methods.
141.705 Approved laboratories.
141.706 Reporting source water monitoring results.
141.707 Grandfathering previously collected data.

Disinfection Profiling and Benchmarking Requirements

141.708 Requirements when making a significant change in disinfection practice.
141.709 Developing the disinfection profile and benchmark.

Treatment Technique Requirements

141.710 Bin classification for filtered systems.
141.711 Filtered system additional *Cryptosporidium* treatment requirements.
141.712 Unfiltered system *Cryptosporidium* treatment requirements.
141.713 Schedule for compliance with *Cryptosporidium* treatment requirements.
141.714 Requirements for uncovered finished water storage facilities.

Requirements for Microbial Toolbox Components

141.715 Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.
141.716 Source toolbox components.
141.717 Pre-filtration treatment toolbox components.
141.718 Treatment performance toolbox components.
141.719 Additional filtration toolbox components.
141.720 Inactivation toolbox components.

Reporting and Recordkeeping Requirements

141.721 Reporting requirements.
141.722 Recordkeeping requirements.

Requirements for Sanitary Surveys Performed by EPA

141.723 Requirements to respond to significant deficiencies identified in sanitary surveys performed by EPA.

Subpart W—Enhanced Treatment for *Cryptosporidium*

General Requirements

§ 141.700 General requirements.

(a) The requirements of this subpart W are national primary drinking water regulations. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for *Cryptosporidium.* These requirements are in addition to requirements for filtration and disinfection in subparts H, P, and T of this part.

(b) *Applicability.* The requirements of this subpart apply to all subpart H systems, which are public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water.

(1) Wholesale systems, as defined in § 141.2, must comply with the requirements of this subpart based on the population of the largest system in the combined distribution system.

(2) The requirements of this subpart for filtered systems apply to systems required by National Primary Drinking Water Regulations to provide filtration treatment, whether or not the system is currently operating a filtration system.

(3) The requirements of this subpart for unfiltered systems apply only to unfiltered systems that timely met and continue to meet the filtration avoidance criteria in subparts H, P, and T of this part, as applicable.

(c) *Requirements.* Systems subject to this subpart must comply with the following requirements:

(1) Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for *Cryptosporidium, E. coli,* and turbidity as described in §§ 141.701 through 141.706, to determine what level, if any, of additional *Cryptosporidium* treatment they must provide.

(2) Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in §§ 141.708 through 141.709.

(3) Filtered systems must determine their *Cryptosporidium* treatment bin classification as described in § 141.710 and provide additional treatment for *Cryptosporidium,* if required, as described in § 141.711. All unfiltered systems must provide treatment for *Cryptosporidium* as described in § 141.712. Filtered and unfiltered systems must implement *Cryptosporidium* treatment according to the schedule in § 141.713.

(4) Systems with uncovered finished water storage facilities must comply with the requirements to cover the facility or treat the discharge from the facility as described in § 141.714.

(5) Systems required to provide additional treatment for *Cryptosporidium* must implement microbial toolbox options that are designed and operated as described in §§ 141.715 through 141.720.

(6) Systems must comply with the applicable recordkeeping and reporting requirements described in §§ 141.721 through 141.722.

(7) Systems must address significant deficiencies identified in sanitary surveys performed by EPA as described in § 141.723.

Source Water Monitoring Requirements

§ 141.701 Source water monitoring.

(a) *Initial round of source water monitoring.* Systems must conduct the following monitoring on the schedule in paragraph (c) of this section unless they meet the monitoring exemption criteria in paragraph (d) of this section.

(1) Filtered systems serving at least 10,000 people must sample their source water for *Cryptosporidium, E. coli,* and turbidity at least monthly for 24 months.

(2) Unfiltered systems serving at least 10,000 people must sample their source water for *Cryptosporidium* at least monthly for 24 months.

(3)(i) Filtered systems serving fewer than 10,000 people must sample their source water for *E. coli* at least once every two weeks for 12 months.

(ii) A filtered system serving fewer than 10,000 people may avoid *E. coli* monitoring if the system notifies the State that it will monitor for *Cryptosporidium* as described in paragraph (a)(4) of this section. The system must notify the State no later than 3 months prior to the date the system is otherwise required to start *E. coli* monitoring under § 141.701(c).

(4) Filtered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted under paragraph (a)(3) of this section:

(i) For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/100 mL.

(ii) For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/100 mL.

(iii) The system does not conduct *E. coli* monitoring as described in paragraph (a)(3) of this section.

(iv) Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of paragraph (a)(4) of this section based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.

(5) For filtered systems serving fewer than 10,000 people, the State may approve monitoring for an indicator other than *E. coli* under paragraph (a)(3) of this section. The State also may approve an alternative to the *E. coli* concentration in paragraph (a)(4)(i), (ii) or (iv) of this section to trigger *Cryptosporidium* monitoring. This approval by the State must be provided to the system in writing and must include the basis for the State's determination that the alternative indicator and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in § 141.710.

(6) Unfiltered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.

(7) Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.

(b) *Second round of source water monitoring.* Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in paragraph (a) of this section, unless they meet the monitoring exemption criteria in paragraph (d) of this section. Systems must conduct this monitoring on the schedule in paragraph (c) of this section.

(c) *Monitoring schedule.* Systems must begin the monitoring required in paragraphs (a) and (b) of this section no later than the month beginning with the date listed in this table:

SOURCE WATER MONITORING STARTING DATES TABLE

Systems that serve . . .	Must begin the first round of source water monitoring no later than the month beginning . . .	And must begin the second round of source water monitoring no later than the month beginning . . .
(1) At least 100,000 people	(i) October 1, 2006	(ii) April 1, 2015.
(2) From 50,000 to 99,999 people	(i) April 1, 2007	(ii) October 1, 2015.
(3) From 10,000 to 49,999 people	(i) April 1, 2008	(ii) October 1, 2016.
(4) Fewer than 10,000 and monitor for *E. coli*[a]	(i) October 1, 2008	(ii) October 1, 2017.
(5) Fewer than 10,000 and monitor for *Cryptosporidium*[b].	(i) April 1, 2010	(ii) April 1, 2019.

[a] Applies only to filtered systems.
[b] Applies to filtered systems that meet the conditions of paragraph (a)(4) of this section and unfiltered systems.

(d) *Monitoring avoidance.* (1) Filtered systems are not required to conduct source water monitoring under this subpart if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium,* equivalent to meeting the treatment requirements of Bin 4 in § 141.711.

(2) Unfiltered systems are not required to conduct source water monitoring under this subpart if the system will provide a total of at least 3-log *Cryptosporidium* inactivation, equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in § 141.712.

(3) If a system chooses to provide the level of treatment in paragraph (d)(1) or (2) of this section, as applicable, rather than start source water monitoring, the system must notify the State in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under § 141.702. Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the State in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the

applicable treatment compliance date in § 141.713.

(e) *Plants operating only part of the year.* Systems with subpart H plants that operate for only part of the year must conduct source water monitoring in accordance with this subpart, but with the following modifications:

(1) Systems must sample their source water only during the months that the plant operates unless the State specifies another monitoring period based on plant operating practices.

(2) Systems with plants that operate less than six months per year and that monitor for *Cryptosporidium* must collect at least six *Cryptosporidium* samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.

(f)(1) *New sources.* A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under paragraph (c) of this section must monitor the new source on a schedule the State approves. Source water monitoring must meet the requirements of this subpart. The system must also meet the bin classification and *Cryptosporidium* treatment requirements of §§ 141.710 and 141.711 or § 141.712, as applicable, for the new source on a schedule the State approves.

(2) The requirements of § 141.701(f) apply to subpart H systems that begin operation after the monitoring start date applicable to the system's size under paragraph (c) of this section.

(3) The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under § 141.710 or determination of the mean *Cryptosporidium* level under § 141.712, as applicable.

(g) Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of §§ 141.702 through 141.706 is a monitoring violation.

(h) *Grandfathering monitoring data.* Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in paragraph (c) of this section to meet the initial source water monitoring requirements in paragraph (a) of this section. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in § 141.707.

§ 141.702 Sampling schedules.

(a) Systems required to conduct source water monitoring under § 141.701 must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.

(1) Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in § 141.701(c) for each round of required monitoring.

(2)(i) Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under § 141.701(a) to EPA electronically at *https://intranet.epa.gov/lt2/.*

(ii) If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.

(3) Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring § 141.701(a) to the State.

(4) Systems must submit sampling schedules for the second round of source water monitoring § 141.701(b) to the State.

(5) If EPA or the State does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.

(b) Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of paragraph (b)(1) or (2) of this section applies.

(1) If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the State approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.

(2)(i) If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in § 141.704, or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.

(ii) The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the State approves an alternative resampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.

(c) Systems that fail to meet the criteria of paragraph (b) of this section for any source water sample required under § 141.701 must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the State for approval prior to when the system begins collecting the missed samples.

§ 141.703 Sampling locations.

(a) Systems required to conduct source water monitoring under § 141.701 must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the State may approve one set of monitoring results to be used to satisfy the requirements of § 141.701 for all plants.

(b)(1) Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of paragraph (b)(2) of this section.

(2) The State may approve a system to collect a source water sample after chemical treatment. To grant this approval, the State must determine that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.

(c) Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.

(d) *Bank filtration.* (1) Systems that receive *Cryptosporidium* treatment credit for bank filtration under § 141.173(b) or § 141.552(a), as applicable, must collect source water samples in the surface water prior to bank filtration.

(2) Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under § 141.717(c).

(e) *Multiple sources.* Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in paragraph (e)(1) or (2) of this section. The use of multiple sources during monitoring must be consistent with routine operational practice.

(1) If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.

(2) If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either paragraph (e)(2)(i) or (ii) of this section for sample analysis.

(i) Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

(ii) Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.

(f) *Additional Requirements.* Systems must submit a description of their sampling location(s) to the State at the same time as the sampling schedule required under § 141.702. This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the State does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).

§ 141.704 Analytical methods.

(a) *Cryptosporidium.* Systems must analyze for *Cryptosporidium* using *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815-R–05–002 or *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815–R–05–001, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods online from *http://www.epa.gov/safewater/disinfection/lt2* or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW, Washington, DC 20460 (Telephone: 800–426–4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202–566–2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: h*ttp://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(1) Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in paragraph (a) of this section. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in paragraph (a) of this section, up to a packed pellet volume of at least 2 mL.

(2)(i) Matrix spike (MS) samples, as required by the methods in paragraph (a) of this section, must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under § 141.705.

(ii) If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.

(3) Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.

(b) *E. coli.* Systems must use methods for enumeration of E. coli in source water approved in § 136.3(a) of this title.

(1) The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of paragraph (b)(2) of this section.

(2) The State may approve on a case-by-case basis the holding of an *E. coli* sample for up to 48 hours between sample collection and initiation of analysis if the State determines that analyzing an *E. coli* sample within 30 hours is not feasible. *E. coli* samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in § 136.3(a) of this title.

(3) Systems must maintain samples between 0°C and 10°C during storage and transit to the laboratory.

(c) *Turbidity.* Systems must use methods for turbidity measurement approved in § 141.74(a)(1).

§ 141.705 Approved laboratories.

(a) *Cryptosporidium.* Systems must have *Cryptosporidium* samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent State laboratory certification program.

(b) *E. coli.* Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the State for total coliform or fecal coliform analysis under § 141.74 is approved for *E. coli* analysis under this subpart when the laboratory uses the same technique for *E. coli* that the laboratory uses for § 141.74.

(c) *Turbidity.* Measurements of turbidity must be made by a party approved by the State.

§ 141.706 Reporting source water monitoring results.

(a) Systems must report results from the source water monitoring required under § 141.701 no later than 10 days after the end of the first month following the month when the sample is collected.

(b)(1) All systems serving at least 10,000 people must report the results from the initial source water monitoring required under § 141.701(a) to EPA electronically at *https://intranet.epa.gov/lt2/.*

(2) If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.

(c) Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under § 141.701(a) to the State.

(d) All systems must report results from the second round of source water monitoring required under § 141.701(b) to the State.

(e) Systems must report the applicable information in paragraphs (e)(1) and (2) of this section for the source water monitoring required under § 141.701.

(1) Systems must report the following data elements for each *Cryptosporidium* analysis:

Data element.
1. PWS ID.
2. Facility ID.

Data element.
3. Sample collection date.
4. Sample type (field or matrix spike).
5. Sample volume filtered (L), to nearest ¼ L.
6. Was 100% of filtered volume examined.
7. Number of oocysts counted.

(i) For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

(ii) For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.

(iii) For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

(2) Systems must report the following data elements for each *E. coli* analysis:

Data element.
1. PWS ID.
2. Facility ID.
3. Sample collection date.
4. Analytical method number.
5. Method type.
6. Source type (flowing stream, lake/reservoir, GWUDI).
7. *E. coli*/100 mL.
8. Turbidity.[1]

[1] Systems serving fewer than 10,000 people that are not required to monitor for turbidity under § 141.701 are not required to report turbidity with their *E. coli* results.

§ 141.707 Grandfathering previously collected data.

(a)(1) Systems may comply with the initial source water monitoring requirements of § 141.701(a) by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this section and the State must approve.

(2) A filtered system may grandfather *Cryptosporidium* samples to meet the requirements of § 141.701(a) when the system does not have corresponding *E. coli* and turbidity samples. A system that grandfathers *Cryptosporidium* samples without *E. coli* and turbidity samples is not required to collect *E. coli* and turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under § 141.701(a).

(b) *E. coli sample analysis.* The analysis of *E. coli* samples must meet the analytical method and approved laboratory requirements of §§ 141.704 through 141.705.

(c) *Cryptosporidium sample analysis.* The analysis of *Cryptosporidium* samples must meet the criteria in this paragraph.

(1) Laboratories analyzed *Cryptosporidium* samples using one of the analytical methods in paragraphs (c)(1)(i) through (vi) of this section, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods on-line from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave, NW, Washington, DC 20460 (Telephone: 800–426–4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202–566–2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_ register/code_of_federal_ regulations/ibr_locations.html.*

(i) *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815–R–05–002.

(ii) *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815–R–05–001.

(iii) *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA,* 2001, United States Environmental Protection Agency, EPA–821–R–01–025.

(iv) *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA,* 2001, United States Environmental Protection Agency, EPA–821–-R–01–026.

(v) *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA,* 1999, United States Environmental Protection Agency, EPA–821–R–99–006.

(vi) *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA,* 1999, United States Environmental Protection Agency, EPA–821–R–99–001.

(2) For each *Cryptosporidium* sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in paragraph (c)(1) of this section.

(d) *Sampling location.* The sampling location must meet the conditions in § 141.703.

(e) *Sampling frequency. Cryptosporidium* samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in § 141.702(b)(1) and (2) if the system provides documentation of the condition when reporting monitoring results.

(1) The State may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the State specifies to ensure that the data used to comply with the initial source water monitoring requirements of § 141.701(a) are seasonally representative and unbiased.

(2) Systems may grandfather previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, systems must follow the monthly averaging procedure in § 141.710(b)(5) or § 141.712(a)(3), as applicable, when calculating the bin classification for filtered systems or the mean *Cryptosporidium* concentration for unfiltered systems.

(f) *Reporting monitoring results for grandfathering.* Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph. Systems serving at least 10,000 people must report this information to EPA unless the State approves reporting to the State rather than EPA. Systems serving fewer than 10,000 people must report this information to the State.

(1) Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of § 141.701(a). Systems must report this information no later than the date the sampling schedule under § 141.702 is required.

(2) Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in paragraphs (f)(2)(i) through (iv) of this section, no later than two months after the applicable date listed in § 141.701(c).

(i) For each sample result, systems must report the applicable data elements in § 141.706.

(ii) Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the

sampling location specified for source water monitoring under this subpart, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.

(iii) Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.

(iv) For *Cryptosporidium* samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in paragraph (c)(1) of this section were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

(g) If the State determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the State may disapprove the data. Alternatively, the State may approve the previously collected data if the system reports additional source water monitoring data, as determined by the State, to ensure that the data set used under § 141.710 or § 141.712 represents average source water conditions for the system.

(h) If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under § 141.701(a) and some of the data are rejected due to not meeting the requirements of this section, systems must conduct additional monitoring to replace rejected data on a schedule the State approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

Disinfection Profiling and Benchmarking Requirements

§ 141.708 Requirements when making a significant change in disinfection practice.

(a) Following the completion of initial source water monitoring under § 141.701(a), a system that plans to make a significant change to its disinfection practice, as defined in paragraph (b) of this section, must develop disinfection profiles and calculate disinfection benchmarks for *Giardia lamblia* and viruses as described in § 141.709. Prior to changing the disinfection practice, the system must notify the State and must include in this notice the information in paragraphs (a)(1) through (3) of this section.

(1) A completed disinfection profile and disinfection benchmark for *Giardia lamblia* and viruses as described in § 141.709.

(2) A description of the proposed change in disinfection practice.

(3) An analysis of how the proposed change will affect the current level of disinfection.

(b) Significant changes to disinfection practice are defined as follows:

(1) Changes to the point of disinfection;

(2) Changes to the disinfectant(s) used in the treatment plant;

(3) Changes to the disinfection process; or

(4) Any other modification identified by the State as a significant change to disinfection practice.

§ 141.709 Developing the disinfection profile and benchmark.

(a) Systems required to develop disinfection profiles under § 141.708 must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must monitor weekly during the period of operation. Systems must determine log inactivation for *Giardia lamblia* through the entire plant, based on $CT_{99.9}$ values in Tables 1.1 through 1.6, 2.1 and 3.1 of § 141.74(b) as applicable. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the State.

(b) Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in paragraphs (b)(1) through (4) of this section. Systems with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(1) through (4) of this section for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in § 141.74(a).

(1) For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.

(2) For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.

(3) The disinfectant contact time(s) (t) must be determined during peak hourly flow.

(4) The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.

(c) In lieu of conducting new monitoring under paragraph (b) of this section, systems may elect to meet the requirements of paragraphs (c)(1) or (2) of this section.

(1) Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of paragraph (b) of this section may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.

(2) Systems may use disinfection profile(s) developed under § 141.172 or §§ 141.530 through 141.536 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under § 141.172 or §§ 141.530 through 141.536 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.

(d) Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in paragraphs (d)(1) through (3) of this section.

(1) Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (d)(1)(i) or (ii) of this section.

(i) Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.

(ii) Determine successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must

calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/CT_{99.9}$) values together to determine ($\Sigma(CTcalc/CT_{99.9})$).

(2) Systems using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CTcalc/CT_{99.9}$) value of each segment and ($\Sigma(CTcalc/CT_{99.9})$) must be calculated using the method in paragraph (d)(1)(ii) of this section.

(3) The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (d)(1) or (d)(2) of this section by 3.0.

(4) Systems must calculate the log of inactivation for viruses using a protocol approved by the State.

(e) Systems must use the procedures specified in paragraphs (e)(1) and (2) of this section to calculate a disinfection benchmark.

(1) For each year of profiling data collected and calculated under paragraphs (a) through (d) of this section, systems must determine the lowest mean monthly level of both *Giardia lamblia* and virus inactivation. Systems must determine the mean *Giardia lamblia* and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly *Giardia lamblia* and virus log inactivation by the number of values calculated for that month.

(2) The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of *Giardia lamblia* and virus log inactivation in each year of profiling data.

Treatment Technique Requirements

§ 141.710 Bin classification for filtered systems.

(a) Following completion of the initial round of source water monitoring required under § 141.701(a), filtered systems must calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the *Cryptosporidium* results reported under § 141.701(a) and must follow the procedures in paragraphs (b)(1) through (5) of this section.

(b)(1) For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.

(2) For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

(3) For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.

(4) For systems with plants operating only part of the year that monitor fewer than 12 months per year under § 141.701(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

(5) If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs (b)(1) through (4) of this section.

(c) Filtered systems must determine their initial bin classification from the following table and using the *Cryptosporidium* bin concentration calculated under paragraphs (a)–(b) of this section:

BIN CLASSIFICATION TABLE FOR FILTERED SYSTEMS

For systems that are:	With a *Cryptosporidium* bin concentration of . . .[1]	The bin classification is . . .
. . . required to monitor for *Cryptosporidium* under § 141.701.	*Cryptosporidium* <0.075 oocyst/L	Bin 1.
	0.075 oocysts/L ≤*Cryptosporidium* <1.0 oocysts/L	Bin 2.
	1.0 oocysts/L ≤*Cryptosporidium* <3.0 oocysts/L	Bin 3.
	Cryptosporidium ≥3.0 oocysts/L	Bin 4.
. . . serving fewer than 10,000 people and NOT required to monitor for *Cryptosporidium* under § 141.701(a)(4).	NA	Bin 1.

[1] Based on calculations in paragraph (a) or (d) of this section, as applicable.

(d) Following completion of the second round of source water monitoring required under § 141.701(b), filtered systems must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 141.701(b) and following the procedures in paragraphs (b)(1) through (4) of this section. Systems must then redetermine their bin classification using this bin concentration and the table in paragraph (c) of this section.

(e)(1) Filtered systems must report their initial bin classification under paragraph (c) of this section to the State for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in § 141.701(c).

(2) Systems must report their bin classification under paragraph (d) of this section to the State for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in § 141.701(c).

(3) The bin classification report to the State must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

(f) Failure to comply with the conditions of paragraph (e) of this section is a violation of the treatment technique requirement.

§ 141.711 Filtered system additional *Cryptosporidium* treatment requirements.

(a) Filtered systems must provide the level of additional treatment for *Cryptosporidium* specified in this paragraph based on their bin classification as determined under § 141.710 and according to the schedule in § 141.713.

If the system bin classification is . . .	And the system uses the following filtration treatment in full compliance with subparts H, P, and T of this part (as applicable), then the additional *Cryptosporidium* treatment requirements are . . .			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment.
Bin 2	1-log treatment	1.5-log treatment	1-log treatment	[1]
Bin 3	2-log treatment	2.5-log treatment	2-log treatment	[2]
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment	[3]

[1] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 4.0-log.
[2] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.0-log.
[3] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.5-log.

(b)(1) Filtered systems must use one or more of the treatment and management options listed in § 141.715, termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in paragraph (a) of this section.

(2) Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional *Cryptosporidium* treatment required under paragraph (a) of this section using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in §§ 141.716 through 141.720.

(c) Failure by a system in any month to achieve treatment credit by meeting criteria in §§ 141.716 through 141.720 for microbial toolbox options that is at least equal to the level of treatment required in paragraph (a) of this section is a violation of the treatment technique requirement.

(d) If the State determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under § 141.701(a) or § 141.701(b), significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium,* the system must take actions specified by the State to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in § 141.715.

§ 141.712 Unfiltered system *Cryptosporidium* treatment requirements.

(a) *Determination of mean Cryptosporidium level.* (1) Following completion of the initial source water monitoring required under § 141.701(a), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.701(a). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete initial source water monitoring based on the schedule in § 141.701(c).

(2) Following completion of the second round of source water monitoring required under § 141.701(b), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.701(b). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete the second round of source water monitoring based on the schedule in § 141.701(c).

(3) If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the calculation of the mean *Cryptosporidium* level in paragraphs (a)(1) or (2) of this section.

(4) The report to the State of the mean *Cryptosporidium* levels calculated under paragraphs (a)(1) and (2) of this section must include a summary of the source water monitoring data used for the calculation.

(5) Failure to comply with the conditions of paragraph (a) of this section is a violation of the treatment technique requirement.

(b) *Cryptosporidium inactivation requirements.* Unfiltered systems must provide the level of inactivation for *Cryptosporidium* specified in this paragraph, based on their mean *Cryptosporidium* levels as determined under paragraph (a) of this section and according to the schedule in § 141.713.

(1) Unfiltered systems with a mean *Cryptosporidium* level of 0.01 oocysts/L or less must provide at least 2-log *Cryptosporidium* inactivation.

(2) Unfiltered systems with a mean *Cryptosporidium* level of greater than 0.01 oocysts/L must provide at least 3-log *Cryptosporidium* inactivation.

(c) *Inactivation treatment technology requirements.* Unfiltered systems must use chlorine dioxide, ozone, or UV as described in § 141.720 to meet the *Cryptosporidium* inactivation requirements of this section.

(1) Systems that use chlorine dioxide or ozone and fail to achieve the *Cryptosporidium* inactivation required in paragraph (b) of this section on more than one day in the calendar month are in violation of the treatment technique requirement.

(2) Systems that use UV light and fail to achieve the *Cryptosporidium* inactivation required in paragraph (b) of this section by meeting the criteria in § 141.720(d)(3)(ii) are in violation of the treatment technique requirement.

(d) *Use of two disinfectants.* Unfiltered systems must meet the combined *Cryptosporidium* inactivation requirements of this section and *Giardia lamblia* and virus inactivation requirements of § 141.72(a) using a minimum of two disinfectants, and each of two disinfectants must separately achieve the total inactivation required for either *Cryptosporidium, Giardia lamblia,* or viruses.

§ 141.713 Schedule for compliance with *Cryptosporidium* treatment requirements.

(a) Following initial bin classification under § 141.710(c), filtered systems must provide the level of treatment for *Cryptosporidium* required under § 141.711 according to the schedule in paragraph (c) of this section.

(b) Following initial determination of the mean *Cryptosporidium* level under § 141.712(a)(1), unfiltered systems must provide the level of treatment for *Cryptosporidium* required under § 141.712 according to the schedule in paragraph (c) of this section.

(c) *Cryptosporidium treatment compliance dates.*

CRYPTOSPORIDIUM TREATMENT COMPLIANCE DATES TABLE

Systems that serve . . .	Must comply with Cryptosporidium treatment requirements no later than . . .[a]
(1) At least 100,000 people.	(i) April 1, 2012.
(2) From 50,000 to 99,999 people.	(i) October 1, 2012.
(3) From 10,000 to 49,999 people.	(i) October 1, 2013.
(4) Fewer than 10,000 people.	(i) October 1, 2014.

[a] States may allow up to an additional two years for complying with the treatment requirement for systems making capital improvements.

(d) If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under § 141.710(d), the system must provide the level of treatment for *Cryptosporidium* required under § 141.711 on a schedule the State approves.

(e) If the mean *Cryptosporidium* level for an unfiltered system changes following the second round of monitoring, as determined under § 141.712(a)(2), and if the system must provide a different level of *Cryptosporidium* treatment under § 141.712 due to this change, the system must meet this treatment requirement on a schedule the State approves.

§ 141.714 Requirements for uncovered finished water storage facilities.

(a) Systems using uncovered finished water storage facilities must comply with the conditions of this section.

(b) Systems must notify the State of the use of each uncovered finished water storage facility no later than April 1, 2008.

(c) Systems must meet the conditions of paragraph (c)(1) or (2) of this section for each uncovered finished water storage facility or be in compliance with a State-approved schedule to meet these conditions no later than April 1, 2009.

(1) Systems must cover any uncovered finished water storage facility.

(2) Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve inactivation and/or removal of at least 4-log virus, 3-log *Giardia lamblia,* and 2-log *Cryptosporidium* using a protocol approved by the State.

(d) Failure to comply with the requirements of this section is a violation of the treatment technique requirement.

Requirements for Microbial Toolbox Components

§ 141.715 Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.

(a)(1) Systems receive the treatment credits listed in the table in paragraph (b) of this section by meeting the conditions for microbial toolbox options described in §§ 141.716 through 141.720. Systems apply these treatment credits to meet the treatment requirements in § 141.711 or § 141.712, as applicable.

(2) Unfiltered systems are eligible for treatment credits for the microbial toolbox options described in § 141.720 only.

(b) The following table summarizes options in the microbial toolbox:

MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA

Toolbox Option	*Cryptosporidium* treatment credit with design and implementation criteria
Source Protection and Management Toolbox Options	
(1) Watershed control program	0.5-log credit for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in § 141.716(a).
(2) Alternative source/intake management	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in § 141.716(b).
Pre Filtration Toolbox Options	
(3) Presedimentation basin with coagulation	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative State-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in § 141.717(a).
(4) Two-stage lime softening	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in § 141.717(b).
(5) Bank filtration	0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in § 141.717(c).
Treatment Performance Toolbox Options	
(6) Combined filter performance	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in § 141.718(a).
(7) Individual filter performance	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in § 141.718(b).
(8) Demonstration of performance	Credit awarded to unit process or treatment train based on a demonstration to the State with a State- approved protocol. Specific criteria are in § 141.718(c).

MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA—Continued

Toolbox Option	*Cryptosporidium* treatment credit with design and implementation criteria
Additional Filtration Toolbox Options	
(9) Bag or cartridge filters (individual filters)	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in § 141.719(a).
(10) Bag or cartridge filters (in series)	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in § 141.719(a).
(11) Membrane filtration	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in § 141.719(b).
(12) Second stage filtration	0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in § 141.719(c)
(13) Slow sand filters	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in § 141.719(d).
Inactivation Toolbox Options	
(14) Chlorine dioxide	Log credit based on measured CT in relation to CT table. Specific criteria in § 141.720(b)
(15) Ozone	Log credit based on measured CT in relation to CT table. Specific criteria in § 141.720(b).
(16) UV	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria in § 141.720(d).

§ 141.716 Source toolbox components.

(a) *Watershed control program.* Systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this section.

(1) Systems that intend to apply for the watershed control program credit must notify the State of this intent no later than two years prior to the treatment compliance date applicable to the system in § 141.713.

(2) Systems must submit to the State a proposed watershed control plan no later than one year before the applicable treatment compliance date in § 141.713. The State must approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in paragraphs (a)(2)(i) through (iv) of this section.

(i) Identification of an ''area of influence'' outside of which the likelihood of *Cryptosporidium* or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under paragraph (a)(5)(ii) of this section.

(ii) Identification of both potential and actual sources of *Cryptosporidium* contamination and an assessment of the relative impact of these sources on the system's source water quality.

(iii) An analysis of the effectiveness and feasibility of control measures that could reduce *Cryptosporidium* loading from sources of contamination to the system's source water.

(iv) A statement of goals and specific actions the system will undertake to reduce source water *Cryptosporidium* levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

(3) Systems with existing watershed control programs (*i.e.,* programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in paragraph (a)(2) of this section and must specify ongoing and future actions that will reduce source water *Cryptosporidium* levels.

(4) If the State does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log *Cryptosporidium* treatment credit will be awarded unless and until the State subsequently withdraws such approval.

(5) Systems must complete the actions in paragraphs (a)(5)(i) through (iii) of this section to maintain the 0.5-log credit.

(i) Submit an annual watershed control program status report to the State. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the State or as the result of the watershed survey conducted under paragraph (a)(5)(ii) of this section. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the State prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.

(ii) Undergo a watershed sanitary survey every three years for community water systems and every five years for noncommunity water systems and submit the survey report to the State. The survey must be conducted according to State guidelines and by persons the State approves.

(A) The watershed sanitary survey must meet the following criteria: encompass the region identified in the State-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water *Cryptosporidium* levels; and identify any significant new sources of *Cryptosporidium.*

(B) If the State determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the State requires, which may be earlier than the regular date in paragraph (a)(5)(ii) of this section.

(iii) The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon

request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The State may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

(6) If the State determines that a system is not carrying out the approved watershed control plan, the State may withdraw the watershed control program treatment credit.

(b) *Alternative source.* (1) A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the State approves, a system may determine its bin classification under § 141.710 based on the alternative source monitoring results.

(2) If systems conduct alternative source monitoring under paragraph (b)(1) of this section, systems must also monitor their current plant intake concurrently as described in § 141.701.

(3) Alternative source monitoring under paragraph (b)(1) of this section must meet the requirements for source monitoring to determine bin classification, as described in §§ 141.701 through 141.706. Systems must report the alternative source monitoring results to the State, along with supporting information documenting the operating conditions under which the samples were collected.

(4) If a system determines its bin classification under § 141.710 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in § 141.713.

§ 141.717 Pre-filtration treatment toolbox components.

(a) *Presedimentation.* Systems receive 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.

(1) The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.

(2) The system must continuously add a coagulant to the presedimentation basin.

(3) The presedimentation basin must achieve the performance criteria in paragraph (3)(i) or (ii) of this section.

(i) Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: $\log_{10}$(monthly mean of daily influent turbidity) − $\log_{10}$(monthly mean of daily effluent turbidity).

(ii) Complies with State-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.

(b) *Two-stage lime softening.* Systems receive an additional 0.5-log *Cryptosporidium* treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.

(c) *Bank filtration.* Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this paragraph. Systems using bank filtration when they begin source water monitoring under § 141.701(a) must collect samples as described in § 141.703(d) and are not eligible for this credit.

(1) Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in paragraph (c)(4) of this section.

(2) Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.

(3) Only horizontal and vertical wells are eligible for treatment credit.

(4) For vertical wells, the ground water flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For horizontal wells, the ground water flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.

(5) Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the State and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the State determines that microbial removal has been compromised, the State may revoke treatment credit until the system implements corrective actions approved by the State to remediate the problem.

(6) Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under § 141.718(c).

(7) *Bank filtration demonstration of performance.* The State may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in paragraphs (c)(1)–(5) of this section.

(i) The study must follow a State-approved protocol and must involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.

(ii) The study must include sampling both from the production well(s) and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well(s).

§ 141.718 Treatment performance toolbox components.

(a) *Combined filter performance.* Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in § 141.74(a) and (c).

(b) *Individual filter performance.* Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log *Cryptosporidium* treatment credit, which can be in

addition to the 0.5-log credit under paragraph (a) of this section, during any month the system meets the criteria in this paragraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in § 141.174 or § 141.560, as applicable.

(1) The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.

(2) No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

(3) Any system that has received treatment credit for individual filter performance and fails to meet the requirements of paragraph (b)(1) or (2) of this section during any month does not receive a treatment technique violation under § 141.711(c) if the State determines the following:

(i) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

(ii) The system has experienced no more than two such failures in any calendar year.

(c) *Demonstration of performance.* The State may approve *Cryptosporidium* treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than or less than the prescribed treatment credits in § 141.711 or §§ 141.717 through 141.720 and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

(1) Systems cannot receive the prescribed treatment credit for any toolbox box option in §§ 141.717 through 141.720 if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.

(2) The demonstration of performance study must follow a State-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the system.

(3) Approval by the State must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The State may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

§ 141.719 Additional filtration toolbox components.

(a) *Bag and cartridge filters.* Systems receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in paragraphs (a)(1) through (10) of this section. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of paragraphs (a)(2) through (9) of this section to the State. The filters must treat the entire plant flow taken from a subpart H source.

(1) The *Cryptosporidium* treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in paragraphs (a)(2) through (a)(9) of this section. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in paragraphs (a)(2) through (9) of this section.

(2) Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of *Cryptosporidium.* Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.

(3) Challenge testing must be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium.* The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

(4) The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation:

$$\text{Maximum Feed Concentration} = 1 \times 10^{4} \times (\text{Filtrate Detection Limit})$$

(5) Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

(6) Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this subpart.

(7) Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation:

$$LRV = LOG_{10}(C_f) - LOG_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during challenge testing; C_f = the feed concentration measured during the challenge test; and C_p = the filtrate concentration measured during the challenge test. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term C_p must be set equal to the detection limit.

(8) Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up of a new filter; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter (LRV_{filter}) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.

(9) If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRV_{filter} among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of LRV_{filter} values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(10) If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of

the modified filter must be conducted and submitted to the State.

(b) *Membrane filtration.* (1) Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in § 141.2 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under paragraph (b)(1)(i) and (ii) of this section.

(i) The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (b)(2) of this section.

(ii) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in paragraph (b)(3) of this section.

(2) *Challenge Testing.* The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the State. Challenge testing must be conducted according to the criteria in paragraphs (b)(2)(i) through (vii) of this section. Systems may use data from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria in paragraphs (b)(2)(i) through (vii) of this section.

(i) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(ii) Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

(iii) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

$$\text{Maximum Feed Concentration} = 3.16 \times 10^6 \times (\text{Filtrate Detection Limit})$$

(iv) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (*i.e.*, backwashing).

(v) Removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation:

$$LRV = LOG_{10}(C_f) \times LOG_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during the challenge test; C_f = the feed concentration measured during the challenge test; and C_p = the filtrate concentration measured during the challenge test. Equivalent units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term C_p is set equal to the detection limit for the purpose of calculating the LRV. An LRV must be calculated for each membrane module evaluated during the challenge test.

(vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then $LRV_{C\text{-}Test}$ is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(vii) The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration module. This performance test must be applied to each production membrane module used by the system that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

(viii) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the State.

(3) *Direct integrity testing.* Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in paragraphs (b)(3)(i) through (vi) of this section. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (*i.e.*, one or more leaks that could result in contamination of the filtrate).

(i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(ii) The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

(iii) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the State, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either paragraph (b)(3)(iii)(A) or (B) of this section as applicable to the type of direct integrity test the system uses.

(A) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = LOG_{10}\,(Q_p / (VCF \times Q_{breach}))$$

Where:

LRV_{DIT} = the sensitivity of the direct integrity test; Q_p = total design filtrate flow from the membrane unit; Q_{breach} = flow of water from an

integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(B) For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = LOG_{10}(C_f) - LOG_{10}(C_p)$$

Where:

LRV_{DIT} = the sensitivity of the direct integrity test; C_f = the typical feed concentration of the marker used in the test; and C_p = the filtrate concentration of the marker from an integral membrane unit.

(iv) Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the State.

(v) If the result of a direct integrity test exceeds the control limit established under paragraph (b)(3)(iv) of this section, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

(vi) Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The State may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.

(4) *Indirect integrity monitoring.* Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in paragraphs (b)(4)(i) through (v) of this section. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in paragraphs (b)(3)(i) through (v) of this section is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the State summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

(i) Unless the State approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

(ii) Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.

(iii) Continuous monitoring must be separately conducted on each membrane unit.

(iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in paragraphs (b)(3)(i) through (v) of this section.

(v) If indirect integrity monitoring includes a State-approved alternative parameter and if the alternative parameter exceeds a State-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (v) of this section.

(c) *Second stage filtration.* Systems receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the State approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

(d) *Slow sand filtration (as secondary filter).* Systems are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This paragraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

§ 141.720 Inactivation toolbox components.

(a) *Calculation of CT values.* (1) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under paragraph (b) or (c) of this section must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in §§ 141.74(a) through (b).

(2) Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.

(b) *CT values for chlorine dioxide and ozone.* (1) Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in paragraph (a) of this section.

CT VALUES (MG·MIN/L) FOR *Cryptosporidium* INACTIVATION BY CHLORINE DIOXIDE [1]

Log credit	Water Temperature, °C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25	159	153	140	128	107	90	69	45	29	19	12
(ii) 0.5	319	305	279	256	214	180	138	89	58	38	24
(iii) 1.0	637	610	558	511	429	360	277	179	116	75	49
(iv) 1.5	956	915	838	767	643	539	415	268	174	113	73
(v) 2.0	1275	1220	1117	1023	858	719	553	357	232	150	98
(vi) 2.5	1594	1525	1396	1278	1072	899	691	447	289	188	122

CT VALUES (MG·MIN/L) FOR *Cryptosporidium* INACTIVATION BY CHLORINE DIOXIDE [1]—Continued

Log credit	Water Temperature, °C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(vii) 3.0	1912	1830	1675	1534	1286	1079	830	536	347	226	147

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = $(0.001506 \times (1.09116)^{Temp}) \times CT$.

(2) Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding ozone CT values for the applicable water temperature, as described in paragraph (a) of this section.

CT VALUES (MG·MIN/L) FOR *Cryptosporidium* INACTIVATION BY OZONE [1]

Log credit	Water Temperature, °C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
(ii) 0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
(iii) 1.0	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
(iv) 1.5	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
(v) 2.0	48	46	42	38	32	26	20	12	7.8	4.9	3.1
(vi) 2.5	60	58	52	48	40	33	25	16	9.8	6.2	3.9
(vii) 3.0	72	69	63	57	47	39	30	19	12	7.4	4.7

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = $(0.0397 \times (1.09757)^{Temp}) \times CT$.

(c) *Site-specific study.* The State may approve alternative chlorine dioxide or ozone CT values to those listed in paragraph (b) of this section on a site-specific basis. The State must base this approval on a site-specific study a system conducts that follows a State-approved protocol.

(d) *Ultraviolet light.* Systems receive *Cryptosporidium, Giardia lamblia,* and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in paragraph (d)(1) of this section. Systems must validate and monitor UV reactors as described in paragraphs (d)(2) and (3) of this section to demonstrate that they are achieving a particular UV dose value for treatment credit.

(1) *UV dose table.* The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in paragraph (d)(2) of this section. The UV dose values in this table are applicable only to post-filter applications of UV in filtered systems and to unfiltered systems.

UV DOSE TABLE FOR *Cryptosporidium, Giardia lamblia,* AND VIRUS INACTIVATION CREDIT

Log credit	*Cryptosporidium* UV dose (mJ/cm^2)	*Giardia lamblia* UV dose (mJ/cm^2)	Virus UV dose (mJ/cm^2)
(i) 0.5	1.6	1.5	39
(ii) 1.0	2.5	2.1	58
(iii) 1.5	3.9	3.0	79
(iv) 2.0	5.8	5.2	100
(v) 2.5	8.5	7.7	121
(vi) 3.0	12	11	143
(vii) 3.5	15	15	163
(viii) 4.0	22	22	186

(2) *Reactor validation testing.* Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in paragraph (d)(1) of this section (*i.e.,* validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.

(i) When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.

(ii) Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(iii) The State may approve an alternative approach to validation testing.

(3) *Reactor monitoring.* (i) Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under paragraph (d)(2) of this section. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the State designates

based on UV reactor operation. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the State approves.

(ii) To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in paragraphs (d)(1) and (2) of this section. Systems must demonstrate compliance with this condition by the monitoring required under paragraph (d)(3)(i) of this section.

Reporting and Recordkeeping Requirements

§ 141.721 Reporting requirements.

(a) Systems must report sampling schedules under § 141.702 and source water monitoring results under § 141.706 unless they notify the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(d).

(b) Systems must report the use of uncovered finished water storage facilities to the State as described in § 141.714.

(c) Filtered systems must report their *Cryptosporidium* bin classification as described in § 141.710.

(d) Unfiltered systems must report their mean source water *Cryptosporidium* level as described in § 141.712.

(e) Systems must report disinfection profiles and benchmarks to the State as described in §§ 141.708 through 141.709 prior to making a significant change in disinfection practice.

(f) Systems must report to the State in accordance with the following table for any microbial toolbox options used to comply with treatment requirements under § 141.711 or § 141.712. Alternatively, the State may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

MICROBIAL TOOLBOX REPORTING REQUIREMENTS

Toolbox option	Systems must submit the following information	On the following schedule
(1) Watershed control program (WCP).	(i) Notice of intention to develop a new or continue an existing watershed control program.	No later than two years before the applicable treatment compliance date in § 141.713
	(ii) Watershed control plan	No later than one year before the applicable treatment compliance date in § 141.713.
	(iii) Annual watershed control program status report	Every 12 months, beginning one year after the applicable treatment compliance date in § 141.713.
	(iv) Watershed sanitary survey report	For community water systems, every three years beginning three years after the applicable treatment compliance date in § 141.713. For noncommunity water systems, every five years beginning five years after the applicable treatment compliance date in § 141.713.
(2) Alternative source/intake management.	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results.	No later than the applicable treatment compliance date in § 141.713.
(3) Presedimentation	Monthly verification of the following: (i) Continuous basin operation (ii) Treatment of 100% of the flow (iii) Continuous addition of a coagulant (iv) At least 0.5-log mean reduction of influent turbidity or compliance with alternative State-approved performance criteria.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(4) Two-stage lime softening	Monthly verification of the following: (i) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration (ii) Both stages treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(5) Bank filtration	(i) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit).	No later than the applicable treatment compliance date in § 141.713.
	(ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause..	Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(6) Combined filter performance.	Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(7) Individual filter performance.	Monthly verification of the following: (i) Individual filter effluent (IFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter (ii) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.]
(8) Demonstration of performance.	(i) Results from testing following a State approved protocol.	No later than the applicable treatment compliance date in § 141.713.
	(ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.

MICROBIAL TOOLBOX REPORTING REQUIREMENTS—Continued

Toolbox option	Systems must submit the following information	On the following schedule
(9) Bag filters and cartridge filters.	(i) Demonstration that the following criteria are met: (A) Process meets the definition of bag or cartridge filtration; (B) Removal efficiency established through challenge testing that meets criteria in this subpart.	No later than the applicable treatment compliance date in § 141.713.
	(ii) Monthly verification that 100% of plant flow was filtered.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(10) Membrane filtration	(i) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this subpart; (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline.	No later than the applicable treatment compliance date in § 141.713.
	(ii) Monthly report summarizing the following: (A) All direct integrity tests above the control limit; (B) If applicable, any turbidity or alternative state-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(11) Second stage filtration ..	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(12) Slow sand filtration (as secondary filter).	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from subpart H sources..	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(13) Chlorine dioxide	Summary of CT values for each day as described in § 141.720..	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(14) Ozone	Summary of CT values for each day as described in § 141.720..	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(15) UV	(i) Validation test results demonstrating operating conditions that achieve required UV dose.	No later than the applicable treatment compliance date in § 141.713.
	(ii) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in 141.720(d)..	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.

§ 141.722 Recordkeeping requirements.

(a) Systems must keep results from the initial round of source water monitoring under § 141.701(a) and the second round of source water monitoring under § 141.701(b) until 3 years after bin classification under § 141.710 for filtered systems or determination of the mean *Cryptosporidium* level under § 141.710 for unfiltered systems for the particular round of monitoring.

(b) Systems must keep any notification to the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(d) for 3 years.

(c) Systems must keep the results of treatment monitoring associated with microbial toolbox options under §§ 141.716 through 141.720 and with uncovered finished water reservoirs under § 141.714, as applicable, for 3 years.

Requirements for Sanitary Surveys Performed by EPA

§ 141.723 Requirements to respond to significant deficiencies identified in sanitary surveys performed by EPA.

(a) A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.

(b) For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

(c) For sanitary surveys performed by EPA, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.

(d) Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by EPA, or if there is no approved schedule, according to the schedule reported under paragraph (c) of this section if such deficiencies are within the control of the system.

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

■ 8. The authority citation for part 142 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, 300j-9 and 300j-11.

■ 9. Section 142.14 is amended by adding paragraph (a)(9) to read as follows:

§ 142.14 Records kept by States.

* * * * *

(a) * * *

(9) Any decisions made pursuant to the provisions of part 141, subpart W of this chapter.

(i) Results of source water *E. coli* and *Cryptosporidium* monitoring.

(ii) The bin classification after the initial and after the second round of source water monitoring for each filtered system, as described in § 141.710 of this chapter.

(iii) Any change in treatment requirements for filtered systems due to watershed assessment during sanitary surveys, as described in § 141.711(d) of this chapter.

(iv) The determination of whether the mean *Cryptosporidium* level is greater than 0.01 oocysts/L after the initial and after the second round of source water monitoring for each unfiltered system, as described in § 141.712(a) of this chapter.

(v) The treatment processes or control measures that systems use to meet their *Cryptosporidium* treatment requirements under § 141.711 or § 141.712 of this chapter.

(vi) A list of systems required to cover or treat the effluent of an uncovered finished water storage facility, as specified in § 141.714 of this chapter.

* * * * *

■ 10. Section 142.15 is amended by adding paragraph (c)(6) to read as follows:

§ 142.15 Reports by States.

(c) * * *

(6) *Subpart W.* (i) The bin classification after the initial and after the second round of source water monitoring for each filtered system, as described in § 141.710 of this chapter.

(ii) Any change in treatment requirements for these systems due to watershed assessment during sanitary surveys, as described in § 141.711(d) of this chapter.

(iii) The determination of whether the mean *Cryptosporidium* level is greater than 0.01 oocysts/L both after the initial and after the second round of source water monitoring for each unfiltered system, as described in § 141.712(a) of this chapter.

* * * * *

■ 11. Section 142.16 is amended by adding paragraph (n) to read as follows:

§ 142.16 Special primacy conditions.

* * * * *

(n) *Requirements for States to adopt 40 CFR part 141, subpart W.* In addition to the general primacy requirements elsewhere in this part, including the requirements that State regulations be at least as stringent as Federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, subpart W, must contain a description of how the State will accomplish the following program requirements where allowed in State programs.

(1) Approve an alternative to the *E. coli* levels that trigger *Cryptosporidium* monitoring by filtered systems serving fewer than 10,000 people, as described in § 141.701(a)(5).

(2) Assess significant changes in the watershed and source water as part of the sanitary survey process and determine appropriate follow-up action for systems, as described in § 141.711(d) of this chapter.

(3) Approve watershed control programs for the 0.5-log treatment credit in the microbial toolbox, as described in § 141.716(a) of this chapter.

(4) Approve protocols for demonstration of performance treatment credits in the microbial toolbox, as allowed under § 141.718(c) of this chapter.

(5) Approve protocols for alternative ozone and chlorine dioxide CT values in the microbial toolbox, as allowed under § 141.720(c) of this chapter.

(6) Approve an alternative approach to UV reactor validation testing in the microbial toolbox, as allowed under § 141.720(d)(2)(iii) of this chapter.

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Appendix C
Rule Fact Sheets/Quick Reference Guides

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LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet

WHAT IS THE LT2ESWTR?

The U.S. Environmental Protection Agency (EPA) published the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) on January 5, 2006. The LT2ESWTR improves control of microbial pathogens. The LT2ESWTR requires source water monitoring at public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI) (i.e., Subpart H PWSs). Based on system size and filtration type, systems need to monitor for *Cryptosporidium*, *E. coli*, and turbidity.

WHAT IS THE PURPOSE OF SOURCE WATER MONITORING?

Source water monitoring data will be used to categorize the source water *Cryptosporidium* concentration into one of four "bin" classifications that have associated treatment requirements. The LT2ESWTR provides other options for systems to comply with the **initial** source water monitoring requirements:

- Submit data from *Cryptosporidium* samples collected before the system must begin source water monitoring (i.e., Grandfathered), and the data must meets certain requirements.

- Filtered systems may skip source water monitoring and commit to provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirement of Bin 4. Unfiltered systems skip source water monitoring and commit to provide a total of at least 3-log *Cryptosporidium* inactivation, which is equal to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L. Systems that decide to skip monitoring and provide maximum treatment must notify the state in writing.

A **second round** of source water monitoring will follow 6 years after the system makes its initial bin determination. Grandfathering is not available for the second round of source water monitoring.

Note: E. coli and turbidity data may not be grandfathered unless the system is also grandfathering corresponding *Cryptosporidium* data.

WHAT ARE THE INITIAL SOURCE WATER MONITORING REQUIREMENTS?

The source water monitoring requirements of the LT2ESWTR apply to all Subpart H PWSs. You are subject to initial source water monitoring requirements if you do not have existing monitoring data that meets grandfathering requirements. For more information on source water monitoring requirements, see EPA's *Source Water Monitoring Guidance Manual for Public Water Systems for the Final Long Term 2 Enhanced Surface Water Treatment Rule* (EPA 815-R06-005 February 2006), available at www.epa.gov/safewater/disinfection/lt2/compliance.html.

Prior to beginning initial source water monitoring, you must submit a sampling schedule that specifies the calendar dates when you will collect the required source water samples. The samples must be evenly spaced throughout the monitoring period (e.g., monthly on the 15th of each month). However, the schedule may be altered to take into account holidays, weekends, or other events. All the samples must be taken within a 5-day window (i.e., you can take the sample up to 2 days before or 2 days after

the date indicated in the schedule). In addition, you must submit a description of the intended sampling location in relation to the source and any treatment processes, as well as a description of any points of chemical addition, and filter backwash recycle.

- **FILTERED SYSTEMS SERVING AT LEAST 10,000 PEOPLE** – You must collect *Cryptosporidium*, *E. coli* and turbidity samples at least monthly for 24 months.

- **UNFILTERED SYSTEMS SERVING AT LEAST 10,000 PEOPLE** – You must sample for *Cryptosporidium* at least monthly for 24 months.

Alternately, you may notify the EPA or the state that you elect not to conduct source water monitoring and commit to providing the maximum treatment of 5.5 log removal or inactivation.

WHEN MUST I COMPLY WITH THE MONITORING REQUIREMENTS?

The system compliance schedule is based on the population served by your system. **A PWS must conduct monitoring based on the requirements of the largest system in the combined distribution system.** The interconnected wholesale/consecutive systems relationships have been determined by the state.

Systems that serve....	≥ 100,000 people (Schedule 1) [1]	50,000 to 99,999 people (Schedule 2) [1]	10,000 to 49,999 people (Schedule 3) [1]
Submit: Sample Schedule and Sample Location Description	July 1, 2006	January 1, 2007	January 1, 2008
Must begin the first round of source water monitoring by...	October 2006	April 2007	April 2008
Submit Grandfathered Data (if applicable)	December 1, 2006	June 1, 2007	June 1, 2008
Submit Bin Classification (Filtered) or Mean *Cryptosporidium* Level (Unfiltered)	March 2009	September 2009	September 2010
Comply with additional LT2ESWTR treatment technique requirements[2]	April 1, 2012	October 1, 2012	October 1, 2013
Must begin the second round of source water monitoring by...	April 2015	October 2015	October 2016

[1] Your schedule is defined by the largest system in your combined distribution system.

[2] State may allow up to an additional 2 years for capital improvements to comply with the treatment technique.

WHAT IS A BIN CLASSIFICATION?

FILTERED SYSTEMS SERVING AT LEAST 10,000 PEOPLE – You will be classified into a "bin" based on the results of your source water monitoring. Your bin classification determines whether further treatment for *Cryptosporidium* is required. A second round of source water monitoring is required 6 years after your initial bin classification and may affect your bin classification.

For systems that are:	Mean *Cryptosporidium* Concentration[1]	Bin Classification
…required to monitor for *Cryptosporidium*	< 0.075 oocysts/L	Bin 1
	from 0.075 to < 1.0 oocysts/L	Bin 2
	from 1.0 to < 3.0 oocysts/L	Bin 3
	≥ 3.0 oocysts/L	Bin 4

[1] Samples must be analyzed by an approved laboratory and use EPA method 1622 or 1623.

ADDITIONAL TREATMENT REQUIREMENTS FOR FILTERED SYSTEMS – Additional treatment is required if the bin classification is a 2, 3, or 4. Refer to the table below for the additional *Cryptosporidium* treatment requirements.

Bin Classification	If the system uses the following filtration treatment in full compliance with existing requirements, then the additional *Cryptosporidium* treatment requirements are…			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment
Bin 2	1-log treatment	1.5-log treatment	1-log treatment	(1)
Bin 3	2-log treatment	2.5-log treatment	2-log treatment	(2)
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment	(3)

(1) As determined by the state such that the total *Cryptosporidium* removal and inactivation is at least 4.0-log.
(2) As determined by the state such that the total *Cryptosporidium* removal and inactivation is at least 5.0-log.
(3) As determined by the state such that the total *Cryptosporidium* removal and inactivation is at least 5.5-log.

For information on the toolbox options that can be used to achieve additional log removal requirements, see the *Long Term 2 Enhanced Surface Water Treatment Rule Toolbox Guidance Manual* (draft version anticipated late 2006).

UNFILTERED SYSTEMS SERVING AT LEAST 10,000 PEOPLE – You must calculate an arithmetic mean of all *Cryptosporidium* samples concentrations required. Following completion of the second round of source water monitoring, you must provide a level of inactivation for *Cryptosporidium* based on the arithmetic mean of your *Cryptosporidium* sample concentrations.

For systems that are:	Mean *Cryptosporidium* Concentration[1]	*Cryptosporidium* inactivation
Unfiltered	≤ 0.01 oocysts/L	2-log
	> 0.01 oocysts/L	3-log

[1] Samples must be analyzed by an approved laboratory and use EPA method 1622 or 1623.

ARE YOU CONSIDERING MAKING A CHANGE TO YOUR DISINFECTION PRACTICES?

After completing the initial round of source water monitoring, systems that plan to make a significant change to their disinfection practice must notify the state, develop disinfection profiles, and calculate disinfection benchmarks for *Giardia lamblia* and viruses. To develop a profile and benchmark, PWSs must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. The disinfection benchmark is an indicator of disinfection effectiveness and depends upon the inactivation of *Giardia lamblia* or viruses. The benchmark is determined by calculating the average daily inactivation value for each of 12 consecutive months. The lowest monthly average becomes the disinfection benchmark. If the PWS has data from more than 1 year, the benchmark is the average of the lowest monthly average value for each of the years. A PWS may use grandfathered data that is substantially equivalent to develop the disinfection profiles for *Giardia lamblia* and viruses. The Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) Disinfection Profiling and Benchmarking Technical Guidance Manual (EPA 816-R-03-004, May 2003), provides guidance for developing a disinfection profile and benchmark. EPA has developed two tools for systems to determine their disinfection profile and calculate the benchmark at the following website: http://www.epa.gov/safewater/mdbp/lt1eswtr.html.

ADDITIONAL GUIDANCE MATERIALS

The following guidance document addresses the source water monitoring requirements for the LT2ESWTR:

- *Source Water Monitoring Guidance Manual for Public Water Systems for the Final Long Term 2 Enhanced Surface Water Treatment Rule* (EPA 815-R06-005 February 2006) – Provides surface water systems, laboratories, states, and Tribes with a review of the source water monitoring provisions. The source water monitoring guidance manual provides direction to the systems on how, where and when to monitor, how to report the data, how to submit "grandfathered" data (e.g., previously collected data), and how the data can be evaluated and used to determine risk bin classification.

For additional guidance on implementing the LT2ESWTR, you may refer to the following existing and future EPA materials:

- LT2ESWTR Quick Reference Guides (Schedules 1 – 3)
- On-line Microscopy Training Module
- On-line Sample Collection Module
- *Microbial Laboratory Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule* (EPA 815-R06-006 February 2006)
- *Membrane Filtration Guidance Manual* (EPA 815-R-06-009 November 2005)
- Membrane Filtration Guidance Manual: Overview and Summary Factsheet (www.epa.gov/safewater/disinfection/lt2/pdfs/guide_lt2_membranefiltration_fs_final.pdf)
- *Ultraviolet Disinfection Guidance Manual and Workbook* (final version anticipated mid-2006)
- *Simultaneous Compliance Guidance Manual for Stage 2 Rules* (draft version anticipated mid-2006)
- *Long Term 2 Enhanced Surface Water Treatment Rule Toolbox Guidance Manual* (draft version anticipated late 2006)

For additional information, please contact the Safe Drinking Water Hotline at 1-800-426-4791, send an email to stage2mdbp@epa.gov, or visit www.epa.gov/safewater/disinfection/lt2.

LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet

WHAT IS THE LT2ESWTR?

The U.S. Environmental Protection Agency (EPA) published the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) on January 5, 2006. The LT2ESWTR improves control of microbial pathogens. The LT2ESWTR requires source water monitoring at public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI) (i.e., Subpart H PWSs). Based on system size and filtration type, systems need to monitor for *Cryptosporidium*, *E. coli*, and turbidity. This factsheet is for systems that serve less than 10,000 people. **Note, if you sell water to a system that serves greater than 10,000 people or are part of a combined distribution system and one of the consecutive systems has a population greater than 10,000 people, please refer to the** *LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet* **(EPA 816-F-06-017)**.

WHAT IS THE PURPOSE OF SOURCE WATER MONITORING?

Source water monitoring data will be used to categorize the source water *Cryptosporidium* concentration in to one of four "bin" classifications that have associated treatment requirements. The LT2ESWTR provides other options for systems to comply with the **initial** source water monitoring requirements:

- Submit data from *Cryptosporidium* samples collected before the system must begin source water monitoring and the data must meets certain requirements.
- Filtered systems may skip source water monitoring and commit to provide a total of at least 5.5 log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirement of Bin 4. Unfiltered systems skip source water monitoring and commit to provide a total of at least 3 log *Cryptosporidium* inactivation, which is equal to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L. Systems that decide to skip monitoring and provide maximum treatment must notify the state in writing.

A **second round** of source water monitoring will follow 6 years after the system makes its initial bin determination. Grandfathering is not available for the second round of source water monitoring.

WHAT ARE THE INITIAL SOURCE WATER MONITORING REQUIREMENTS?

The source water monitoring requirements of LT2ESWTR apply to all Subpart H PWSs. You are subject to initial source water monitoring requirements if you do not have prior monitoring data that meets grandfathering requirements. For more information on source water monitoring requirements see EPA's *Source Water Monitoring Guidance Manual for Public Water Systems for the Final Long Term 2 Enhanced Surface Water Treatment Rule* (EPA 815-R06-005 February 2006), available at www.epa.gov/safewater/disinfection/lt2/compliance.html.

Two options systems serving less than 10,000 people have to comply with the source water monitoring requirements are:

- Conduct *E. coli* monitoring first and based on those results, the system may or may not need to conduct *Cryptosporidium* monitoring, or
- Systems may go directly to *Cryptosporidium* monitoring.

Prior to beginning initial source water monitoring, you must submit a sampling schedule that specifies the calendar dates when you will collect the required source water samples. The samples must be evenly spaced throughout the monitoring period (e.g., monthly on the 15th of each month). However, the schedule may be altered to take into account holidays, weekends, or other events. All the samples must be taken within a 5-day window (i.e., you can take the sample up to 2 days before or 2 days after the date indicated in the schedule). In addition, you

must submit a description of the intended sampling location in relation to the source and any treatment processes, as well as a description of any points of chemical addition, and filter backwash recycle.

FILTERED SYSTEMS SERVING LESS THAN 10,000 PEOPLE – You should collect *E. coli* samples at least once every 2 weeks for 12 months. You will then be required to monitor for *Cryptosporidium* at least twice per month for 12 months, or at least once per month for 24 months, if either of the following conditions are met:

- For systems using lakes or reservoirs, if the mean annual *E. coli* concentration is greater than 10 *E. coli*/100 mL. This also applies to GWUDI systems if the nearest surface water body is a lake or reservoir.

- For systems using flowing stream sources, if the mean annual *E. coli* concentration is greater than 50 *E. coli*/100 mL. This also applies to GWUDI systems if the nearest surface water body is a flowing stream, or if there is no nearby surface water.

A system may choose to notify EPA or the state it will not collect the *E. coli* samples, but you will collect *Cryptosporidium* samples at least twice per month for 12 months, or at least once per month for 24 months.

UNFILTERED SYSTEMS SERVING LESS THAN 10,000 PEOPLE – You must sample for *Cryptosporidium* at least twice per month for 12 months, or at least once per month for 24 months.

WHEN MUST I COMPLY WITH THE MONITORING REQUIREMENTS?

The system compliance schedule is based on the population served by your system. **A PWS must conduct monitoring based on the requirements of the largest system in the combined distribution system.** The interconnected wholesale/consecutive systems relationships have been determined by the state.

Systems that serve….	< 10,000 and monitor for *E. coli* [1]	< 10,000 and monitor for *Cryptosporidium* [2]
Submit: Sample Schedule and Sample Location Description	July 1, 2008	January 1, 2010
Must begin the first round of source water monitoring by…	October 2008	April 2010
Submit Grandfathered Data (if applicable)	December 1, 2008	June 1, 2010
Submit Bin Classification (Filtered) or Mean *Cryptosporidium* Level (Unfiltered)		September 2012
Comply with additional LT2ESWTR treatment technique requirements[3]		October 1, 2014
Must begin the second round of source water monitoring by…	October 1, 2017	April 1, 2019

[1] Applies only to filtered systems.

[2] Applies to filtered systems that exceed the *E. coli* trigger or do not monitor for *E. coli* and to unfiltered systems.

[3] State may allow up to an additional 2 years for capital improvements to comply with the treatment technique.

WHAT IS A BIN CLASSIFICATION?

FILTERED SYSTEMS SERVING LESS THAN 10,000 PEOPLE – You will be classified into a "bin" based on the results of your source water monitoring. Your bin classification determines whether further treatment for *Cryptosporidium* is required. A second round of source water monitoring is required 6 years after your initial bin classification and may affect your bin classification.

For systems that are:	Mean *Cryptosporidium* Concentration[1]	Bin Classification
…required to monitor for *Cryptosporidium*	< 0.075 oocysts/L	Bin 1
	from 0.075 to < 1.0 oocysts/L	Bin 2
	from 1.0 to < 3.0 oocysts/L	Bin 3
	≥ 3.0 oocysts/L	Bin 4
… not required to monitor for *Cryptosporidium* [2]	N/A	Bin 1

[1] Samples must be analyzed by an approved laboratory and use EPA method 1622 or 1623.

[2] Only for systems that do not exceed the *E. coli* trigger level.

ADDITIONAL TREATMENT REQUIREMENTS FOR FILTERED SYSTEMS – Additional treatment may be required based on your bin classification. Refer to the table below for the additional *Cryptosporidium* treatment requirements.

Bin Classification	If the system uses the following filtration treatment in full compliance with existing requirements, then the additional *Cryptosporidium* treatment requirements are…			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment
Bin 2	1-log treatment	1.5-log treatment	1-log treatment	(1)
Bin 3	2-log treatment	2.5-log treatment	2-log treatment	(2)
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment	(3)

(1) As determined by the state such that the total *Cryptosporidium* removal and inactivation is at least 4.0-log.

(2) As determined by the state such that the total *Cryptosporidium* removal and inactivation is at least 5.0-log.

(3) As determined by the state such that the total *Cryptosporidium* removal and inactivation is at least 5.5-log.

For information on the toolbox options that can be used to achieve additional log removal requirements, see the *Long Term 2 Enhanced Surface Water Treatment Rule Toolbox Guidance Manual* (draft version anticipated late 2006).

UNFILTERED SYSTEMS SERVING LESS THAN 10,000 PEOPLE – You must calculate an arithmetic mean of all *Cryptosporidium* samples concentrations required. Following completion of the second round of source water monitoring, you must provide a level of inactivation for *Cryptosporidium* based on the arithmetic mean of your *Cryptosporidium* sample concentrations.

For systems that are:	Mean *Cryptosporidium* Concentration[1]	*Cryptosporidium* inactivation
Unfiltered	≤ 0.01 oocysts/L	2-log
	> 0.01 oocysts/L	3-log

[1] Samples must be analyzed by an approved laboratory and use EPA method 1622 or 1623.

ARE YOU CONSIDERING MAKING A CHANGE TO YOUR DISINFECTION PRACTICES?

After completing the initial round of source water monitoring, systems that plan to make a significant change to their disinfection practice must notify the state, develop disinfection profiles, and calculate disinfection benchmarks for *Giardia lamblia* and viruses. To develop a profile and benchmark, PWSs must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. The disinfection benchmark is an indicator of disinfection effectiveness based on the inactivation of *Giardia lamblia* or viruses. The benchmark is determined by calculating the average daily inactivation value for each of 12 consecutive months. The lowest monthly average becomes the disinfection benchmark. If the PWS has data from more than 1 year, the benchmark is the average of the lowest monthly average value for each of the years. The Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) Disinfection Profiling and Benchmarking Technical Guidance Manual (EPA 816-R-03-004, May 2003), provides guidance for developing a disinfection profile and benchmark. EPA has developed two tools for systems to determine their disinfection profile and calculate the benchmark at the following website: www.epa.gov/safewater/mdbp/lt1eswtr.html.

ADDITIONAL GUIDANCE MATERIALS

The following guidance document addresses the source water monitoring requirements for the LT2ESWTR:

- *Source Water Monitoring Guidance Manual for Public Water Systems for the Final Long Term 2 Enhanced Surface Water Treatment Rule* (EPA 815-R06-005 February 2006) – Provides surface water systems, laboratories, states, and Tribes with a review of the source water monitoring provisions. The source water monitoring guidance manual provides direction to the systems on how, where and when to monitor, how to report the data, how to submit "grandfathered" data (e.g., previously collected data), and how the data can be evaluated and used to determine risk bin classification.

For additional guidance on implementing the LT2ESWTR, you may refer to the following existing and future EPA materials:

- LT2ESWTR Quick Reference Guides (Schedule 4)
- On-line Microscopy Training Module
- On-line Sample Collection Module
- *Microbial Laboratory Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule* (EPA 815-R06-006 February 2006)
- *Membrane Filtration Guidance Manual* (EPA 815-R-06-009 November 2005)
- Membrane Filtration Guidance Manual: Overview and Summary Factsheet (www.epa.gov/safewater/disinfection/lt2/pdfs/guide_lt2_membranefiltration_fs_final.pdf)
- *Ultraviolet Disinfection Guidance Manual and Workbook* (final version anticipated mid-2006)
- *Simultaneous Compliance Guidance Manual for Stage 2 Rules* (draft version anticipated mid-2006)
- *Small Entity Compliance Guidance* (draft version anticipated mid-2006)
- *Long Term 2 Enhanced Surface Water Treatment Rule Toolbox Guidance Manual* (draft version anticipated late 2006)

For additional information, please contact the Safe Drinking Water Hotline at 1-800-426-4791, send an email to stage2mdbp@epa.gov, or visit www.epa.gov/safewater/disinfection/lt2.

LT2ESWTR Laboratory Factsheet

WHAT IS THE LT2ESWTR?

The U.S. Environmental Protection Agency (EPA) published the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) on January 5, 2006. The goal of the LT2ESWTR is to improve control of microbial pathogens by identifying water systems whose source water is vulnerable to contamination by *Cryptosporidium* and requiring those systems to treat for that greater risk. Key provisions of the LT2ESWTR include:

- Source water monitoring at public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI).
- Monitoring for *Cryptosporidium*, *E. coli*, and turbidity based on system size and filtration type.
- Using Surface water or GWUDI source water monitoring data to categorize the sources according to four "bin" classifications that have associated treatment requirements. Systems that avoid filtration will be placed into one of two categories based on source water monitoring, and will have to meet specified inactivation requirements.
- Using grandfathered data collected before the system must begin *Cryptosporidium* source water monitoring, if the data meet rule requirements. Systems may use this data instead of conducting source water monitoring.

For detailed information regarding source water monitoring, including sampling and shipping procedures, systems should consult the *Source Water Monitoring Guidance Manual For Public Water Systems For The Final Long Term 2 Enhanced Surface Water Treatment Rule* [EPA 815-R06-005 February 2006]), at www.epa.gov/safewater/disinfection/lt2.

WHICH LABORATORIES MUST SYSTEMS USE?

PWSs must use laboratories or personnel approved for source water monitoring analyses required by the rule (i.e., *Cryptosporidium*, *E. coli*, and turbidity sampling).

- *Cryptosporidium* analysis: EPA approves laboratories through the Laboratory Quality Assurance Evaluation Program (the Lab QA Program) to analyze *Cryptosporidium*. The purpose of the Lab QA Program is to identify laboratories that can reliably measure the presence of *Cryptosporidium* in surface water using the EPA Method 1622 or 1623. A list of commercial, government, PWS, and university laboratories approved or pending approval to analyze *Cryptosporidium* is located at www.epa.gov/safewater/disinfection/lt2/lab_aprvlabs.html.
- *E. coli* analysis: Laboratories must be certified by EPA, the National Environmental Laboratory Accreditation Conference, or the state to analyze *E. coli*.
- Turbidity analysis: Analysis must be conducted by a party approved by the state, which usually means a state-certified operator or a professional engineer. You should consult with your state for specific state requirements.

Commercial laboratories and other laboratories that accept samples from an outside party may charge varying rates. Systems may consider contacting multiple laboratories to compare costs. For detailed information on contracting laboratory services, consult the *Source Water Monitoring Guidance Manual for Public Water Systems for the Final Long Term 2 Enhanced Surface Water Treatment Rule [EPA 815-R06-005 February 2006]*, or go online at www.epa.gov/safewater/disinfection/lt2.

WHAT METHODS MUST LABORATORIES USE?

Laboratories and personnel must use methods approved by EPA for *Cryptosporidium*, *E. coli*, and turbidity, as presented in the following tables.

Approved Methods for *E. coli*	Approved Methods for Turbidity
■ Standard Methods 9223B (Colilert/Colilert-18)® ■ Standard Methods 9221B/9221F (LTB-EC-MUG) ■ Standard Methods 9222D/9222G (mFC-NA-MUG) ■ Standard Methods 9213D/ EPA Method 1103.1 (mTEC) ■ EPA Method 1603 Modified mTEC ■ EPA Method 1604 MI medium ■ m-ColiBlue24Broth ■ Standard Methods 9222B/9222G (mEndo/LES-Endo-NA-MUG)	■ Method 2130 B ■ Revised Method 180.1 ■ Great Lakes Instrument (GLI) Method 2

Approved Methods for *Cryptosporidium*
■ Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA, United States Environmental Protection Agency, EPA-815-R-05-002. 2005.
■ Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, United States Environmental Protection Agency, EPA-815-R-05-001. 2005.

WHEN SHOULD SYSTEMS CONTACT LABORATORIES?

PWSs should contact laboratories to discuss contracts and sampling dates as soon as possible. The number of samples processed each day will impact the laboratory's capacity. The PWS and the laboratory must agree on calendar dates for monthly, or more frequent, sample analysis because the PWS must submit a monitoring schedule no later than 3 months before monitoring begins. Monitoring start dates are summarized in the following table.

Systems that serve....	Must begin the first round of source water monitoring...
At least 100,000 people or part of a combined distribution system serving at least 100,000 people	October 2006
50,000 to 99,999 people or part of a combined distribution system serving at least 50,000 to 99,999 people	April 2007
10,000 to 49,999 people or part of a combined distribution system serving at least 10,000 to 49,999 people	April 2008
Less than 10,000 or part of a combined distribution system serving less than 10,000 people, and are filtered and monitoring for *E. coli*	October 2008
Less than 10,000 or part of a combined distribution system serving less than 10,000 people, and are monitoring for *Cryptosporidium*[1]	April 2010

[1]Applies to filtered systems that exceed the *E. coli* trigger or decide not to monitor for *E. coli*, and to unfiltered systems.

For additional information, please contact the Safe Drinking Water Hotline at 1-800-426-4791, send an email to stage2mdbp@epa.gov, or visit www.epa.gov/safewater/disinfection/lt2.

LT2ESWTR Data Collection and Tracking System Factsheet

WHAT IS THE LT2ESWTR?

The U.S. Environmental Protection Agency (EPA) published the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) on January 5, 2006. The LT2ESWTR requires EPA, states, public water systems (PWSs), and laboratories to work together collecting source water monitoring data soon after the rule is finalized.

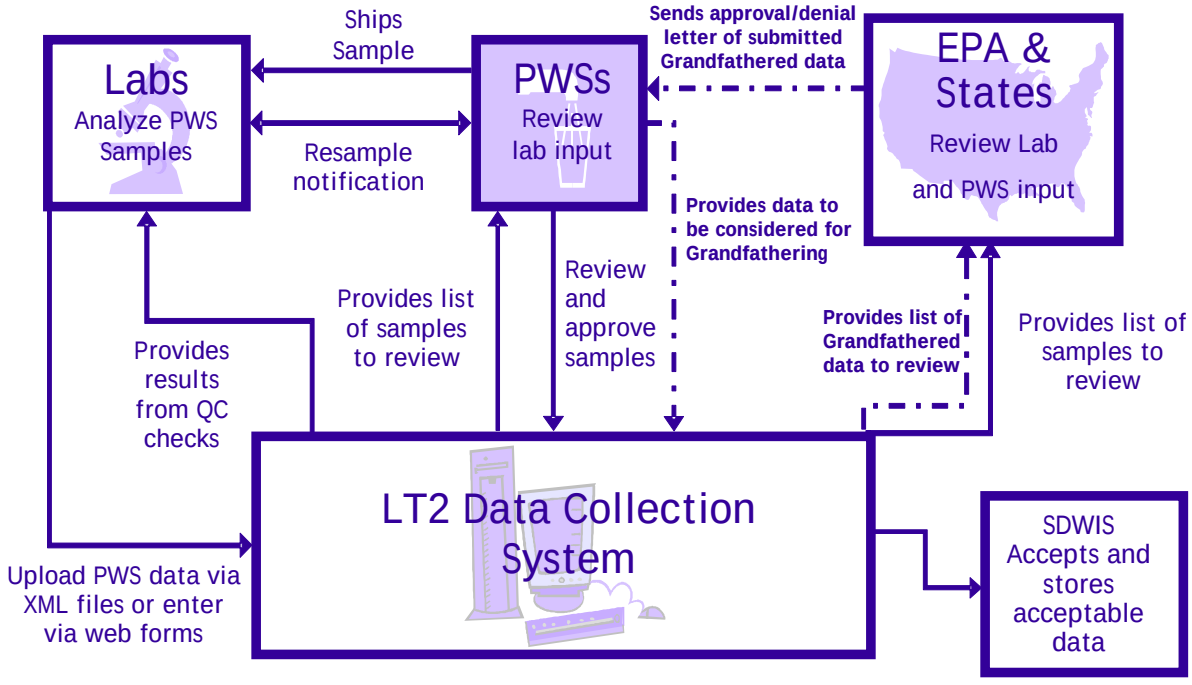
WHAT ARE THE IPMC AND DCTS?

EPA developed the Information Processing and Management Center (IPMC) and Data Collection & Tracking System (DCTS) to help manage data submissions and notifications associated with rule implementation. The IPMC is a processing center that manages electronic and hard copy submittals, the DCTS, and sends notification letters. The DCTS ensures that PWSs can review and approve laboratory-reported data before EPA or the state may access the data. The laboratories can enter data using data collection forms or upload data in XML format. The LT2 Data Collection System automatically calculates final analytical results to reduce the potential for human error.

The IPMC and DCTS have been designed to help EPA and states save time and money by serving as a central processing center that enables real-time tracking, enhances collaboration between states and EPA, and streamlines recordkeeping. Technical assistance is available for IPMC and DCTS users. The DCTS will enable EPA and state reviewers to share notifications, PWS and state contacts, PWS profiles, and data generated for the LT2ESWTR.

WHO SHOULD USE THE DCTS?

The DCTS allows states, PWSs, laboratories, and EPA to upload, review, and/or download information. Specifically, the DCTS allows laboratories to upload *Cryptosporidium* and *E. coli* sampling results. In addition, PWSs can use the DCTS to upload sampling schedules and turbidity sampling results and to review and approve or contest their sampling results uploaded by the laboratory. EPA and states will use the DCTS to track PWSs' progress through compliance with the LT2SWTR source water monitoring requirements. For example EPA and states will review sampling schedules and sampling results. The following schematic summarizes the information flow between labs, PWSs, EPA, and states within the DCTS.



How Does The DCTS Work?

The DCTS is a Web-based application that allows for both manual entry and batch uploads. The system is password protected and accessible only by approved EPA, state drinking water staff, PWSs, and laboratories. Submissions to the DCTS are not considered confidential business information (CBI) and are subject to the Freedom of Information Act (FOIA).

PWSs can create their sampling schedules in the DCTS by entering individual dates, generating a recurrence pattern, or copying a previously entered schedule from another facility. Throughout monitoring, the DCTS compares monitoring dates to scheduled dates to verify compliance. A PWS can also submit data through the DCTS that they want EPA or the state to consider allowing them to use as grandfathered data.

After PWSs collect *Cryptosporidium*, *E. coli*, and turbidity samples and submit them to a laboratory for analysis, the laboratory posts the analytical results to the DCTS. When the laboratory approves and releases the sampling results for PWS review, the PWS can logon to the DCTS to review the data. The PWS must electronically approve the data within 10 days of the end of month following the month the sample was collected. [Note: If the PWS does not approve their posted data in that time period, the database will automatically process the data as submitted by the laboratory with a flag to indicate the PWS did not approve the data.] When *Cryptosporidium* monitoring is complete, the PWS uses the sampling data to calculate the mean *Cryptosporidium* concentration. DCTS can keep a running calculation of the mean *Cryptosporidium* concentration for the PWS, but a final calculation and bin determination will need to be submitted by the PWS to EPA or the state.

All PWSs serving at least 10,000 people must report results from the initial source water monitoring to EPA electronically at www.epa.gov/safewater/disinfection/tools/tools-dcts.html. A PWS that is **unable** to report monitoring results electronically may use an EPA or state approved alternative approach for reporting. PWSs serving less than 10,000 people must report results from the initial source water monitoring to the state. EPA encourages all systems to submit their source water monitoring results electronically. The following table summarizes options available to labs and systems for submitting data to the DCTS.

Options for Meeting LT2ESWTR Submission Requirements to the DCTS [1]

Option 1	Option 2	Option 3 [2]
Upload sampling schedule or sampling data directly to the Web site [2]	With EPA or state approval, mail paper copies to: US EPA-IPMC P.O. Box 98 Dayton, OH 45401	With EPA or state approval, e-mail electronic submissions as attachments to: stage2mdbp@epa.gov

[1] PWSs and labs must use one of these three options to submit information to the DCTS. In addition, PWSs can send copies of submissions to the state, but this is not required.

[2] Go to EPA's Web site at www.epa.gov/safewater/disinfection/tools/tools-dcts.html to submit information (e.g., sampling schedule, monitoring data, or intent to provide maximum treatment) and for a list of acceptable file formats.

Will The DCTS Integrate Into Other Database Systems?

Although the database design is independent of EPA's Safe Drinking Water Information System (SDWIS), the DCTS is built to easily integrate with EPA's Office of Water's data systems (i.e., Central Data Exchange (CDX), and SDWIS). For example, a state can download an XML file (e.g., inventory, laboratory, or violation schema) from the DCTS and then have the option to upload the file to SDWIS/State or other state databases.

How Can The DCTS Be Accessed?

The DCTS is available on the Web, but requires a username and password. The site is located at www.epa.gov/safewater/disinfection/tools/tools-dcts.html. Each laboratory and PWS that is registered with the DCTS has an Administrative User. The Administrative User is responsible for the initial registration of the entire lab or PWS.

For additional information, please contact the Safe Drinking Water Hotline at 1-800-426-4791, send an email to stage2mdbp@epa.gov, or visit www.epa.gov/safewater/disinfection/lt2.

EPA United States Environmental Protection Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 1 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment.
Utilities Covered	▸ Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). ▸ Schedule 1 systems include PWSs serving 100,000 or more people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves 100,000 or more people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered and unfiltered systems must conduct 24 months of source water monitoring for *Cryptosporidium*. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems will be classified into one of four "Bins" based on the results of their source water monitoring. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Systems may also use previously collected data (i.e., Grandfathered data). Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: ▸ Cover the uncovered finished water storage facility; or, ▸ Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1	No additional treatment required	No additional treatment required	No additional treatment required	No additional treatment required
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 1)

July 1, 2006	**Systems must submit their:** ▸ **Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring to EPA electronically; or** ▸ **Notify EPA or the state of the systems intent to submit results for grandfathering data; or** ▸ **Notify EPA or the state of the systems intent to provide at least 5.5 log of treatment for *Cryptosporidium*. Systems should consult with EPA or their state prior to submitting this notice.**
October 2006	**No later than this month systems must begin 24 months of source water monitoring.**
December 10, 2006	**System submit results for first month of source water monitoring.**
December 1, 2006	**No later than this date, systems must submit monitoring results for data that they want to have grandfathered.**
April 1, 2008	**No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.**
September 2008	**No later than this month, systems must complete their inital round of source water monitoring.**
March 2009	**No later than this month, filtered systems must report their initial bin classification to the EPA or the state for approval.**
March 2009	**No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.**
April 1, 2009	**No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.**
March 31, 2012	**Systems must install and operate additional treatment in accordance with their bin classification.†**
January 1, 2015	**Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of source water monitoring to the state.**
April 1, 2015	▸ **Systems are required to begin conducting a second round of source water monitoring.** ▸ **Based on the results, systems must re-determine their bin classification and provide additional *Cryptosporidium* treatment, if necessary.**

For States

January - June 2006	**States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.**
April 1, 2007	**States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.**
October 5, 2007	**States are encouraged to submit final primacy applications or extension requests to EPA.**
January 5, 2008	**Final primacy applications must be submitted to EPA, unless granted an extension.**
June 30, 2008	**States should begin awarding *Cryptosporidium* treatment credit for primary treatments in place.**
January 5, 2010	**Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.**
December 31, 2012	**States should award *Cryptosporidium* treatment credit for toolbox option implementation.**

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/lt2; or contact your State drinking water representative.

EPA United States Environmental Protection Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 2 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment.
Utilities Covered	▸ Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). ▸ Schedule 2 systems include PWSs serving 50,000 to 99,999 people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves 50,000 to 99,999 people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered and unfiltered systems must conduct 24 months of source water monitoring for *Cryptosporidium*. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems will be classified into one of four "Bins" based on the results of their source water monitoring. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Systems may also use previously collected data (i.e., Grandfathered data). Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: ▸ Cover the uncovered finished water storage facility; or, ▸ Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1	No additional treatment required	No additional treatment required	No additional treatment required	No additional treatment required
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 2)

January 1, 2007	**Systems must submit their:** ▸ **Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring to EPA electronically; or** ▸ **Notify EPA or the state of the systems intent to submit results for grandfathering data; or** ▸ **Notify EPA or the state of the systems intent to provide at least 5.5 log of treatment for *Cryptosporidium*. Systems should consult with EPA or their state prior to submitting this notice.**
April 2007	**No later than this month, systems must begin 24 months of source water monitoring.**
June 10, 2007	**System submit results for first month of source water monitoring.**
June 1, 2007	**No later than this date, systems must submit monitoring results for data that they want to have grandfathered.**
April 1, 2008	**No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.**
March 2009	**No later than this month, systems must complete their inital round of source water monitoring.**
April 1, 2009	**No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.**
September 2009	**No later than this month, filtered systems must report their initial bin classification to the EPA or the state for approval.**
September 2009	**No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.**
September 30, 2012	**Systems must install and operate additional treatment in accordance with their bin classification.†**
July 1, 2015	**Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of source water monitoring to the state.**
Ocotber 1, 2015	▸ **Systems are required to begin conducting a second round of source water monitoring.** ▸ **Based on the results, systems must re-determine their bin classification and provide additional *Cryptosporidium* treatment, if necessary.**

For States

January - June 2006	**States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.**
April 1, 2007	**States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.**
October 5, 2007	**States are encouraged to submit final primacy applications or extension requests to EPA.**
January 5, 2008	**Final primacy applications must be submitted to EPA, unless granted an extension.**
December 31, 2008	**States should begin awarding *Cryptosporidium* treatment credit for primary treatments in place.**
January 5, 2010	**Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.**
June 30, 2013	**States should award *Cryptosporidium* treatment credit for toolbox option implementation.**

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater; or contact your State drinking water representative.

EPA United States Environmental Protection Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 3 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment.
Utilities Covered	▸ Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). ▸ Schedule 3 systems include PWSs serving 10,000 to 49,999 people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves 10,000 to 49,999 people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered and unfiltered systems must conduct 24 months of source water monitoring for *Cryptosporidium*. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems will be classified into one of four "Bins" based on the results of their source water monitoring. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Systems may also use previously collected data (i.e., Grandfathered data). Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: ▸ Cover the uncovered finished water storage facility; or, ▸ Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			Alternative Filtration
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1	No additional treatment required	No additional treatment required	No additional treatment required	No additional treatment required
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 3)

January 1, 2008	**Systems must submit their:** ▸ **Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring to EPA electronically; or** ▸ **Notice to EPA or the state of the system's intent to submit results for grandfathering data; or** ▸ **Notice to EPA or the state of the system's intent to provide at least 5.5-log of treatment for *Cryptosporidium* for filtered systems or 3-log of treatment for unfiltered systems. Systems should consult with EPA or their state prior to submitting this notice.**
April 2008	**No later than this month, systems must begin 24 months of source water monitoring.**
April 1, 2008	**No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.**
June 10, 2008	**Systems submit results for first month of source water monitoring.**
June 1, 2008	**No later than this date, systems must submit monitoring results for data that they want to have grandfathered.**
April 1, 2009	**No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.**
March 2010	**No later than this month, systems must complete their inital round of source water monitoring.**
September 2010	**No later than this month, filtered systems must report their initial bin classification to the EPA or the state for approval.**
September 2010	**No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.**
September 30, 2013	**Systems must install and operate additional treatment in accordance with their bin classification (filtered systems) or mean *Cryptosporidium* level (unfiltered systems).†**
July 1, 2016	**Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of source water monitoring to the state.**
Ocotber 1, 2016	▸ **Systems are required to begin conducting a second round of source water monitoring.** ▸ **Based on the results, systems must re-determine their bin classification (filtered systems) or mean *Cryptosporidium* level (unfiltered systems) and provide additional *Cryptosporidium* treatment, if necessary.**

For States

July - December 2006	**States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.**
April 1, 2007	**States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.**
October 5, 2007	**States are encouraged to submit final primacy applications or extension requests to EPA.**
January 5, 2008	**Final primacy applications must be submitted to EPA, unless granted an extension.**
December 31, 2009	**States should begin determining *Cryptosporidium* treatment credit for primary treatments already in place.**
January 5, 2010	**Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.**
June 30, 2014	**States should award *Cryptosporidium* treatment credit for toolbox option implementation.**

† **States may allow up to an additional 24 months for compliance for systems making capital improvements.**

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/lt2; or contact your state drinking water representative.

EPA United States Environmental Protection Agency

Long Term 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide For Schedule 4 Systems

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 71 FR 654, January 5, 2006, Vol. 71, No. 3
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).
General Description	The LT2ESWTR requires systems to monitor their source water, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment. Filtered systems serving fewer than 10,000 may be eligible to conduct *E. Coli* source water monitoring in lieu of *Cryptosporidium* monitoring.
Utilities Covered	▸ Public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI). ▸ Schedule 4 systems include PWSs serving fewer than 10,000 people OR wholesale PWSs that are part of a combined distribution system in which the largest system serves less than 10,000 people.

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered systems must conduct 12 months of source water monitoring for *E. coli* . If the *E. coli* trigger level is exceeded, the system must conduct an additional 12 to 24 months of source water monitoring for *Cryptosporidium*. Systems may also use previously collected data (i.e., Grandfathered data). Unfiltered systems must sample their source water for *Cryptosporidium* at least twice per month for 12 months or once per month for 24 months. Unfiltered systems will calculate a mean *Cryptosporidium* level to determine treatment requirements. Filtered systems providing at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing at least 3-log of treatment for *Cryptosporidium* and those systems that intend to install this level of treatment are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox." Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: ▸ Cover the uncovered finished water storage facility; or, ▸ Treat the discharge to achieve inactivation and/or removal of at least 4-log for viruses, 3-log for *Giardia lamblia*, and 2-log for *Cryptosporidium*.

Disinfection Profiling and Benchmarking

After completing the initial round of source water monitoring any system that plans on making a significant change to their disinfection practices must:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practice.

Bin Classification For Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional *Cryptosporidium* Treatment Required			
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	Alternative Filtration
< 0.075	Bin 1††	No additional treatment required			
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	(1)
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	(2)
≥ 3.0	Bin 4	2.5 log	3 log	2.5 log	(3)

†† Systems serving < 10,000 people that are not required to monitor for *Cryptosporidium* are placed in Bin 1.
(1) As determined by the state (or other primacy agency) such that the total removal/inactivation > 4.0-log.
(2) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.0-log.
(3) As determined by the state (or other primacy agency) such that the total removal/inactivation > 5.5-log.

Inactivation Requirements for Unfiltered Systems

Cryptosporidium Concentration (oocysts/L)	Required *Cryptosporidium* Inactivation
≤ 0.01	2-log
> 0.01	3-log

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater/disinfection/lt2; or contact your state drinking water representative.

Critical Deadlines and Requirements

For Drinking Water Systems (Schedule 4)

July 1, 2008	Systems must submit their: ▸ Sampling schedule that specifies the dates of sample collection and location of sampling for initial source water monitoring; or ▸ Notice to EPA or the state of the system's intent to submit results for grandfathering data; or ▸ Notice to EPA or the state of the system's intent to provide at least 5.5-log of treatment for *Cryptosporidium* for filtered systems or 3-log of treatment for unfiltered systems. Systems should consult with EPA or their state prior to submitting this notice. ▸ Notice to EPA or the state of the system's intent to conduct *Cryptosporidium* monitoring instead of *E. coli* monitoring.
October 2008	No later than this month, filtered systems must begin 12 months of bi-weekly source water monitoring for *E. coli*.
December 1, 2008	No later than this date, systems must submit *E. coli* monitoring results for data that they want to have grandfathered.
December 10, 2008	Systems submit results for first month of *E. coli* source water monitoring.
April 1, 2008	No later than this date, systems must notify the EPA or the state of all uncovered treated water storage facilities.
April 1, 2009	No later than this date, uncovered finished water storage facilities must be covered, or the water must be treated before entry into the distribution system, or the system must be in compliance with a state approved schedule.
September 2009	No later than this month, systems that were required to monitor their source water for *E. coli* complete their inital round of source water monitoring.
January 1, 2010	Filtered systems required to monitor for *Cryptosporidium* must submit their sampling schedule that specifies the dates of sample collection and location of sampling for source water monitoring.
April 2010	No later than this month, systems required to conduct *Cryptosporidium* monitoring must begin 12 or 24 months of source water monitoring.
June 1, 2010	No later than this date, systems must submit *Cryptosporidium* monitoring results for data that they want to have grandfathered.
June 10, 2010	Systems submit results for first month of *Cryptosporidium* source water monitoring.
March 2012	No later than this month, systems that were required to monitor their source water for *Cryptosporidium* complete their inital round of source water monitoring
September 2012	No later than this month, filtered systems that were required to monitor their source water for *Cryptosporidium* must report their initial bin classification to the EPA or the state for approval.
September 2012	No later than this month, unfiltered systems must report the mean of all *Cryptosporidium* sample results to the EPA or the state.
September 30, 2014	Systems must install and operate additional treatment in accordance with their bin classification or mean *Cryptosporidium* level.†
July 1, 2017	Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of *E. coli* source water monitoring to the state.
October 1, 2017	Systems are required to begin conducting a second round of *E. coli* source water monitoring. Based on the results, systems must re-determine their bin classification and provide additional treatment, if necessary.
January 1, 2019	Systems must submit their sampling schedule that specifies the dates of sample collection and location of sampling for second round of *Cryptosporidium* source water monitoring to the state.
April 1, 2019	Systems are required to begin conducting a second round of *Cryptosporidium* source water monitoring. Based on the results, systems must re-determine their bin classification (filtered systems) or mean *Cryptosporidium* level (unfiltered systems) and provide additional treatment, if necessary.

For States

July - December 2006	States are encouraged to communicate with affected systems regarding LT2ESWTR requirements.
April 1, 2007	States are encouraged to communicate LT2ESWTR requirements related to treatment, uncovered finished water reservoirs, and disinfection profiling to affected systems.
October 5, 2007	States are encouraged to submit final primacy applications or extension requests to EPA.
January 5, 2008	Final primacy applications must be submitted to EPA, unless granted an extension.
June 30, 2010	States should begin determining *Cryptosporidium* treatment credit for primary treatments already in place.
January 5, 2010	Final primacy revision applications from states with approved 2-year extensions agreements must be submitted to EPA.
June 30, 2015	States should award *Cryptosporidium* treatment credit for toolbox option implementation.

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

Appendix D
Flowcharts

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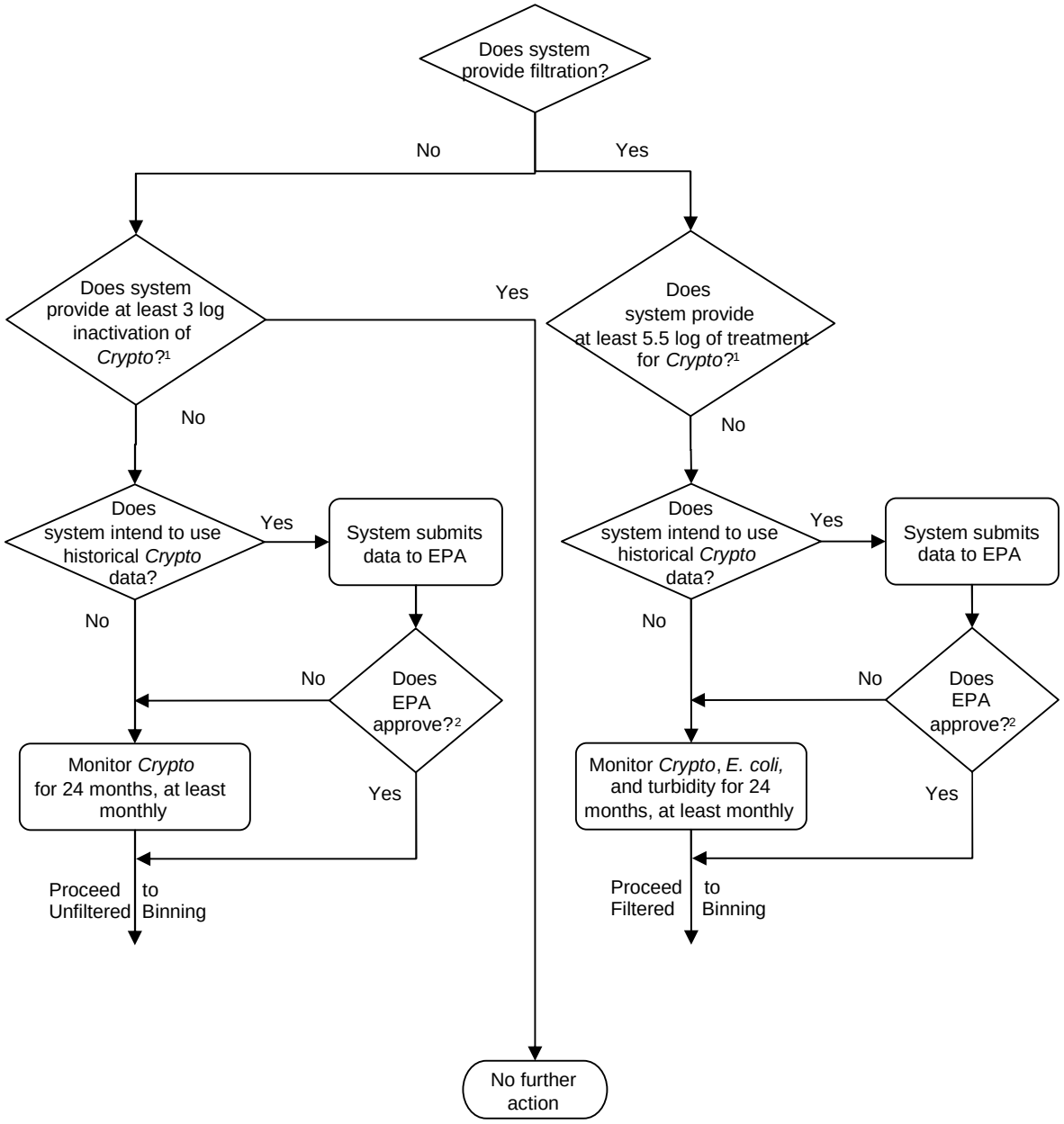
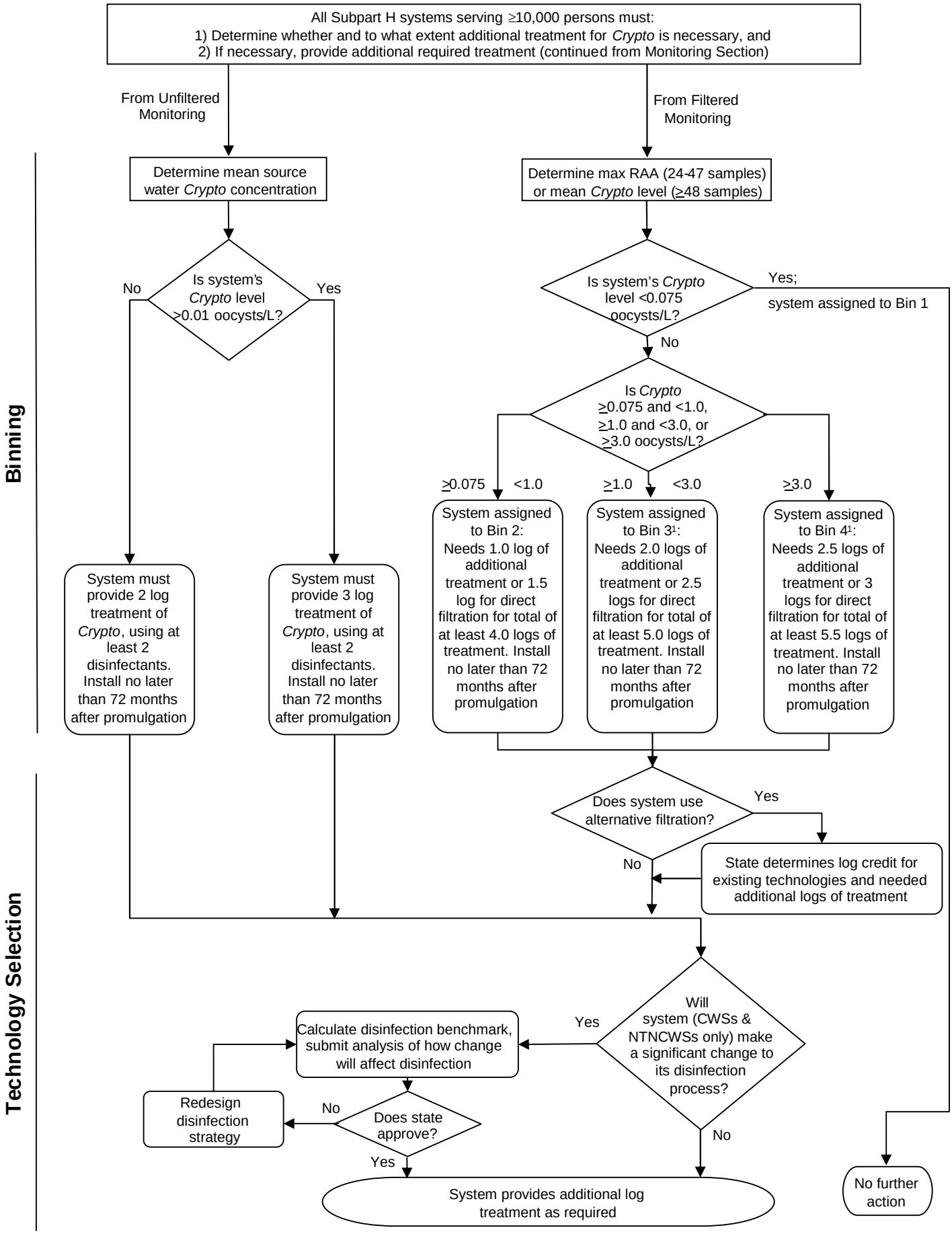
Monitoring

All Subpart H systems serving ≥10,000 persons must:
1) Determine whether and to what extent additional treatment for *Crypto* is necessary, and
2) If necessary, provide additional required treatment



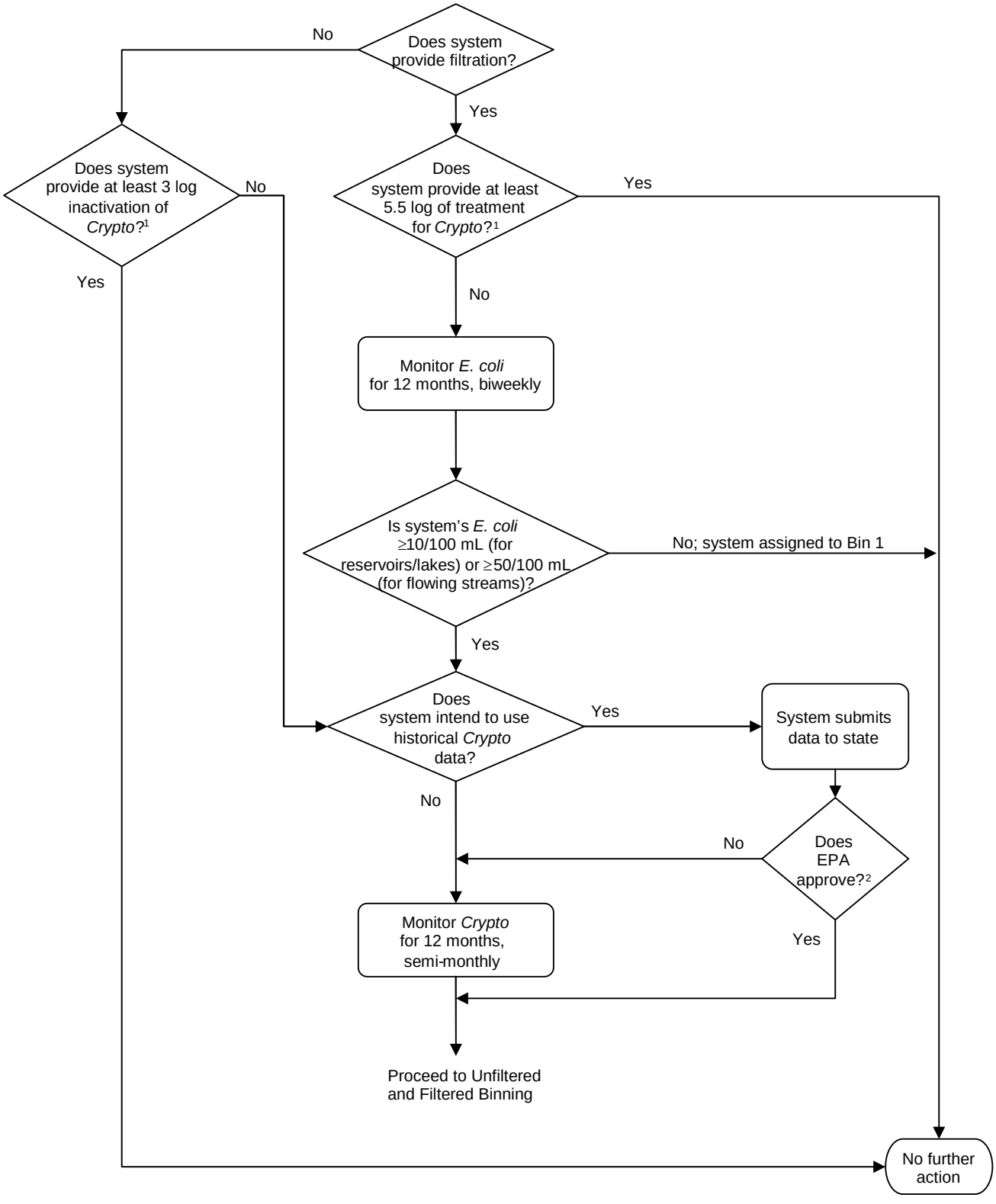
[1] Or will it install such treatment no later than 72 months after date of publication of final rule in the *Federal Register*?
[2] Actual monitoring requirements depend on whether 2 full years of historical *Cryptosporidium* data are available and approved by EPA. If 2 years of data are available and approved, the system follows the process in the flow chart. If less than 2 years of data are available, systems must monitor *Cryptosporidium*, *E. coli*, and turbidity until EPA determines that the new and historical data, when combined, are sufficient.



[1] For additional treatment, at least 1 log of treatment must be additional disinfectant or filtration process from an approved list.

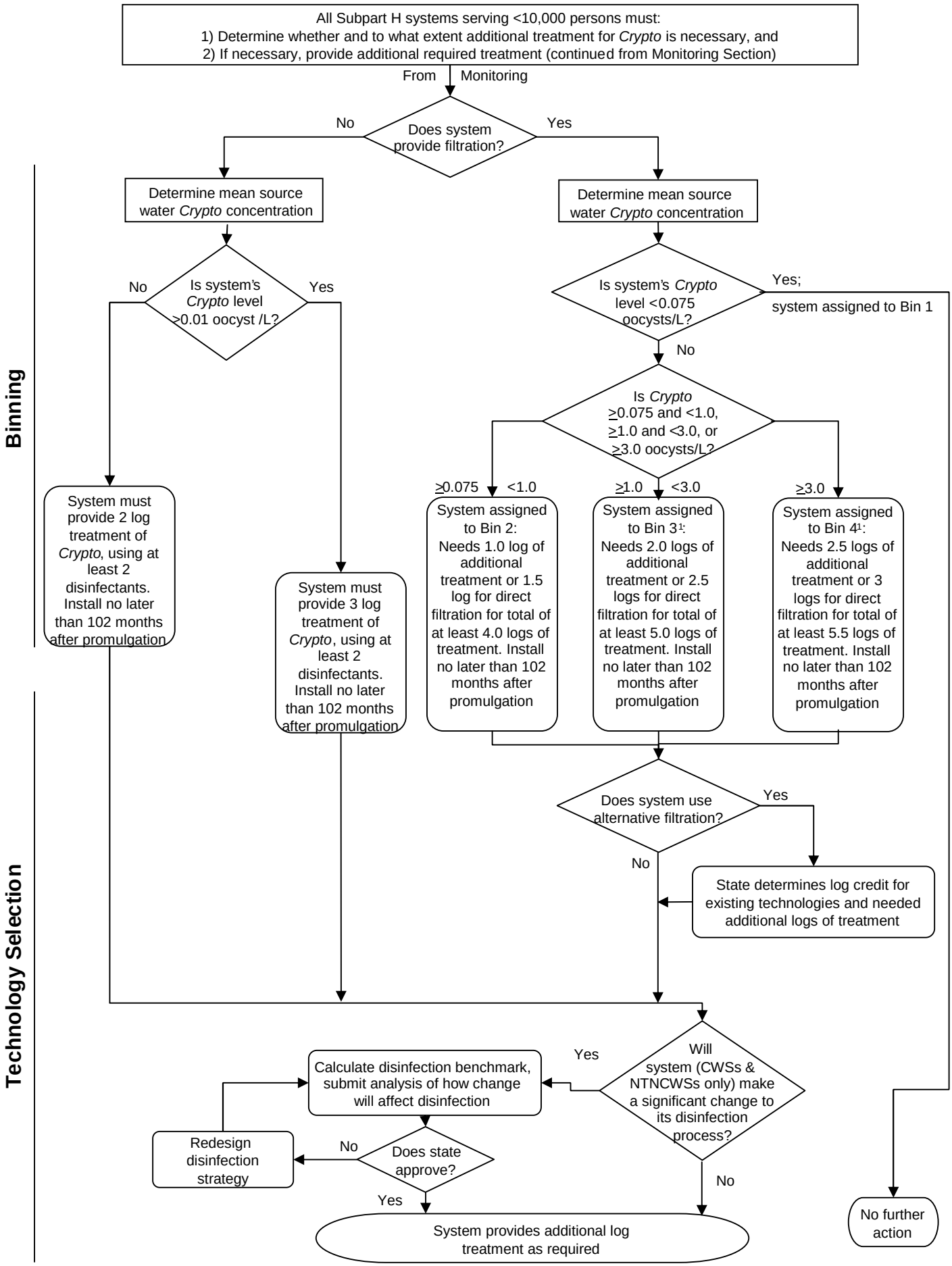
All Subpart H systems serving <10,000 persons must:
1) Determine whether and to what extent additional treatment for *Crypto* is necessary, and
2) If necessary, provide additional treatment

Monitoring

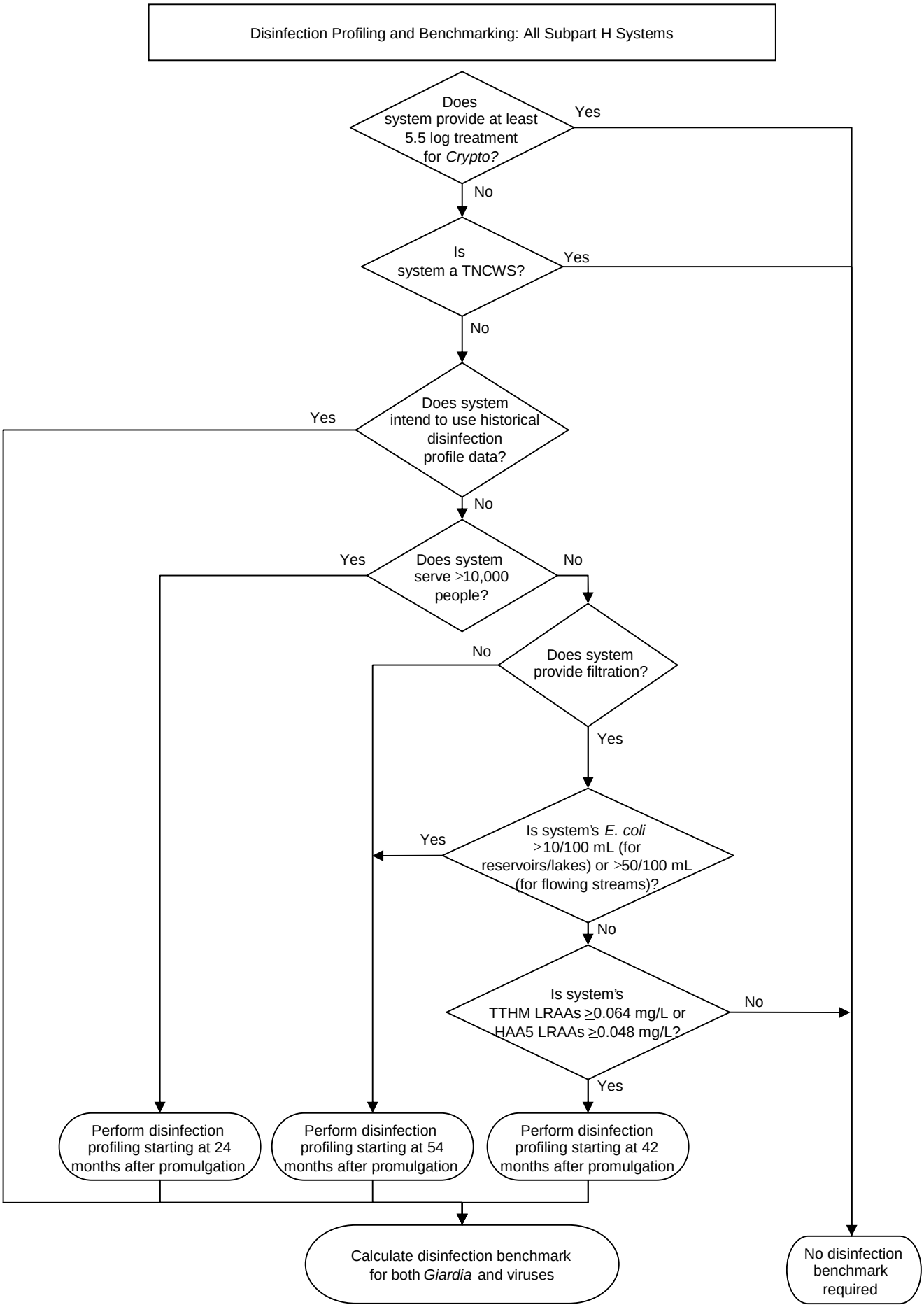


[1] Or will it install such treatment no later than 102 months after date of publication of final rule in the *Federal Register*?

[2] Actual monitoring requirements depend on whether 1 full year of historical *Cryptosporidium* data (24 samples) is available and approved by EPA. If the full amount of data is available and approved, the system follows the process in the chart. If less than 1 year of data is available, systems must monitor *Cryptosporidium* until EPA determines that data are sufficient.



[1] For additional treatment, at least 1 log of treatment must be additional disinfectant or filtration process from an approved list.


Disinfection Profiling and Benchmarking: All Subpart H Systems
Does system provide at least 5.5 log treatment for *Crypto?*
Yes
No
Is system a TNCWS?
Yes
No
Does system intend to use historical disinfection profile data?
Yes
No
Does system serve ≥10,000 people?
Yes
No
Does system provide filtration?
No
Yes
Is system's *E. coli* ≥10/100 mL (for reservoirs/lakes) or ≥50/100 mL (for flowing streams)?
Yes
No
Is system's TTHM LRAAs ≥0.064 mg/L or HAA5 LRAAs ≥0.048 mg/L?
No
Yes
Perform disinfection profiling starting at 24 months after promulgation
Perform disinfection profiling starting at 54 months after promulgation
Perform disinfection profiling starting at 42 months after promulgation
Calculate disinfection benchmark for both *Giardia* and viruses
No disinfection benchmark required

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Appendix E
Template Letters

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Template Letters

The following template letters have been developed as guidance. These templates are not a required format for communicating between EPA or states and the affected systems. However, they will ensure that system receives a formal notice of the issue and documentation for their own records and that EPA or the state has hard-copy documentation of the correspondence with the system.

Written notification may include:

1. Summary of the issue.
2. Appropriate contact if questions arise.
3. Fact sheet or other summary materials (optional). EPA has developed the following fact sheets for the LT2ESWTR:
    - LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet (EPA816-F-06-018 June 2006)
    - LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet (EPA816-F-06-017 June 2006)
    - LT2ESWTR Data Collection and Tracking System Factsheet (EPA816-F-06-019 June 2006)
    - LT2ESWTR Laboratory Factsheet (EPA816-F-06-020 June 2006)

These additional materials can be found on EPA's LT2ESWTR Web site at http://www.epa.gov/safewater/disinfection/lt2.

The following LT2ESWTR template letters include:

- Status of Grandfathered Source Water Data Submission
- Acknowledging Receipt of a System's Intent to Submit Grandfathered Data
- Acknowledging Receipt of a System's Intent Provide Full Treatment
- Informing the System of Re-sampling Requirements Because of Missing Sample(s)
- Informing the System of Re-sampling Requirements Because of a Laboratory Error

Text highlighted should be changed as appropriate to provide accurate information to the system, highlighting should be removed.

Letterhead

Contact Name
System Name
Address
City, State 12345

PWSID: XX1234567

RE: Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
Status of Grandfathered Source Water Data Submission

Dear Mr./Mrs./Ms._____:

On [insert date], this office received a letter from [insert name of system] containing [insert type of data received, *Cryptosporidium*, *E. coli*, turbidity] data from [insert timeframe]. It is understood that [insert name of system] submitted this data in lieu of collecting source water monitoring data required to comply with the LT2ESWTR. This letter is to confirm that the data submitted has been reviewed and approved by this office for the purpose of grandfathering. Your system is still required to collect monthly [insert type of source water data this system will need to collect, *Cryptosporidium*, *E. coli*, turbidity] samples through [insert date this system will need to collect data through before they can use the grandfathered data]. The previous collected data will be added to the end of the 2-year period. Once all required source water monitoring samples are collected, a bin classification will need to be determined for your system. Your bin classification determines whether further treatment for *Cryptosporidium* is required.

A second round of source water monitoring is required as part of the LT2ESWTR. Your bin classification may change based on the results of the second round of monitoring. Grandfathering data will not be accepted for the second round of monitoring.

Additional reference information is attached for your use. If you have questions regarding this letter, please contact us by sending an e-mail to stage2mdbp@epa.gov. For more information regarding this rule visit the LT2ESWTR website at www.epa.gov/safewater/disinfection/lt2.

Enclosures:
LT2ESWTR Quick Reference Guide
LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet
LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet
[list other enclosures]

Letterhead

Contact Name
System Name
Address
City, State 12345

PWSID: XX1234567

RE: Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
Acknowledging Receipt of a System's Intent to Submit Grandfathered Data

Dear Mr./Mrs./Ms._____:

[Placeholder – Template under development]

Additional reference information is attached for your use. If you have questions regarding this letter, please contact us by sending an e-mail to stage2mdbp@epa.gov. For more information regarding this rule visit the LT2ESWTR website at www.epa.gov/safewater/disinfection/lt2.

Enclosures:
LT2ESWTR Quick Reference Guide
LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet
LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet
[list other enclosures]

Letterhead

Contact Name
System Name
Address
City, State 12345

PWSID: XX1234567

RE: Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
Acknowledging Receipt of a System=s Intent Provide Full Treatment

Dear Mr./Mrs./Ms._____:

[Placeholder – Template under development]

Additional reference information is attached for your use. If you have questions regarding this letter, please contact us by sending an e-mail to stage2mdbp@epa.gov. For more information regarding this rule visit the LT2ESWTR website at www.epa.gov/safewater/disinfection/lt2.

Enclosures:
LT2ESWTR Quick Reference Guide
LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet
LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet
[list other enclosures]

Letterhead

Contact Name
System Name
Address
City, State 12345

PWSID: XX1234567

RE: Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
Re-sampling Requirements Because of Missing Sample(s)

Dear Mr./Mrs./Ms._____:

The LT2ESWTR requires systems to sample once per month for [insert what the system must sample for, *Cryptosporidium, E. coli*, Turbidity] in their source water. According to our records the results of your source water samples for [Enter month] were due by [Enter date results due]. These results have not been received. Failure to take your source water samples in compliance with your approved sample schedule is a monitoring violation. Your system is required to provide notice to the public for failure to take the required samples. This public notice must be provided by [Enter date 1-year from violation].

The LT2ESWTR requires systems to collect 24 samples in order to determine the appropriate bin classification. If your system misses 3 or more samples your system will be required to provide special public notice to explain the missed samples. Also your system may not have enough information to make a bin determination. Therefore you system is required to submit a revised sampling schedule that addresses how your system will collect the missed samples. This revised sampling schedule must be submitted by [enter date]. This schedule must be approved by this office prior to your system collecting the missed sample. In addition, your system must continue collect your monthly samples in accordance with your original sampling schedule.

It is required that your system notifies this office immediately with a reason why the sample was missed. Below is a list of possible reasons why the sample was missed:

- An extreme condition or situation existed that posed a danger to the sample collector.
- An extreme condition or situation existed that could not be avoided and caused your system to be unable to sample in the 5-day period.
- The valid analytical result was not reported because of equipment failure, loss of or damage to the sample, or failure to comply with the analytical method requirements.
- The approved laboratory failed to analyze the sample.

Additional reference information is attached for your use. If you have questions regarding this letter, please contact us by sending an e-mail to stage2mdbp@epa.gov. For more information regarding this rule visit the LT2ESWTR website at www.epa.gov/safewater/disinfection/lt2.

Enclosures:
LT2ESWTR Quick Reference Guide
LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet
LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet
[list other enclosures]

Letterhead

Contact Name
System Name
Address
City, State 12345

PWSID: XX1234567

RE: Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)
Re-sampling Requirements Because of a Laboratory Error

Dear Mr./Mrs./Ms._____:

An error occurred at the laboratory for the [insert type of sample, *Cryptosporidium*, *E. coli*, Turbidity] sample submitted on [enter date] by your system for compliance with the LT2ESWTR source water monitoring requirements. Due to this error your system is required to collect a replacement sample no later than 21 days after receiving this letter. If this is not feasible, you must notify this office immediately and provide an explanation of why the sample may not be collected within the 21 days.

Additional reference information is attached for your use. If you have questions regarding this letter, please contact us by sending an e-mail to stage2mdbp@epa.gov. For more information regarding this rule visit the LT2ESWTR website at www.epa.gov/safewater/disinfection/lt2.

Enclosures:
LT2ESWTR Quick Reference Guide
LT2ESWTR Source Water Monitoring for Systems Serving Less Than 10,000 People Factsheet
LT2ESWTR Source Water Monitoring for Systems Serving At Least 10,000 People Factsheet
[list other enclosures]